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**‘NOBODY DELIVERS AT HOME NOW’. WHO AND WHY
WOMEN PARTICIPATE IN A CONDITIONAL CASH
TRANSFER PROGRAM TO PROMOTE INSTITUTIONAL
DELIVERY IN MADHYA PRADESH, INDIA**

Kristi Sidney Annerstedt



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‘NOBODY DELIVERS AT HOME NOW’. WHO AND WHY WOMEN PARTICIPATE IN A CONDITIONAL CASH TRANSFER PROGRAM TO PROMOTE INSTITUTIONAL DELIVERY IN MADHYA PRADESH, INDIA

THESIS FOR DOCTORAL DEGREE (Ph.D.)

By

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To the loves of my life, Nik and Alex

*"If we are going to see real development in the world then our
best investment is WOMEN."*

Desmond Tutu, South African social rights activist and retired Anglican bishop

ABSTRACT

Background: One-fifth of global maternal deaths occur in India making this a serious public health challenge. It is well known that skilled birth attendance and access to quality emergency obstetric care reduces maternal mortality. However, up until 2005, efforts by the government at providing access to emergency obstetric care were thwarted by low uptake of facility-based delivery (39% in the same year). A cash incentive program, Janani Suraksha Yojana (JSY) was implemented in 2005 by the central government to increase facility-based births and reduce maternal mortality. It gave money directly to the women upon discharge from a public health facility after childbirth. Subsequently in 2009 an emergency transport model (Janani Express Yojana, JEY) was implemented to support the JSY program and eliminate physical access barriers to giving birth in a facility.

Methods: Data for this thesis was collected between January 2011 and April 2015 from three districts (Ujjain, Shahdol and Panna) in the central Indian state of Madhya Pradesh. The thesis is organized into four studies (I-IV). In study I, a structured questionnaire was used to identify predictors of JSY program participation and reasons for non-participation in a population-based sample of 478 women. In study II, qualitative interviews with 24 JSY beneficiaries and non-beneficiaries explored reasons for their participation in the program. In study III, a facility-based study among 1,005 women was used to study predictors of emergency transport use. In study IV, another population-based survey assessed out-of-pocket expenditures (OOPE) among 2,615 women giving birth.

Results: Program uptake was high (76%). Women who were uneducated, multiparous or lacked prior knowledge of the JSY program were more likely to deliver at home. Lack of transportation was the main reason for home births at this point in time (study I). The decision of most women to participate in the program reflected a change in social norms towards delivering in a health facility along with individual perceptions of a safe and easy delivery and pressure from an accredited social health activist (ASHA). Many women reported their behavior was influenced by receiving the incentive, but just as many said it did not play a role in their decision to deliver in a facility. Non-participation was often unintentional due to personal circumstances or driven by a perception of poor quality of care in public sector facilities (study II). JEY uptake was greater in women from lower socio-economic backgrounds: rural women were 4.46 times more likely to use JEY (95% CI: 2.38-8.37) compared to urban; and women belonging to scheduled tribes were 1.60 times more likely (95% CI: 1.18-2.16) than women from a general caste. A third of the JEY users experienced a delay in reaching the health facility (study III). The large majority (91%) of women reported OOPE. It was driven largely by indirect costs like informal payments (37%) and food and cloth items for the baby (47%), not direct medical payments (8%). Being a JSY beneficiary increased odds (AOR: 1.58; 95% CI: 1.11- 2.25) of incurring OOPE. However among women who had any OOPE, JSY beneficiaries had a 16% decrease (95% CI: 0.73 - 0.96) in OOPE compared to women who gave birth at home (study IV).

Discussion/Conclusion: There was significant program uptake in our study area with a large majority of poor women participating in the program. There are multiple drivers influencing participation: (i) a number of supporting elements (ASHA, cash incentive, transportation support) and (ii) the program does not occur in a vacuum but in a context with dynamic social norms around childbirth. There were limits to the influence of the cash and behaviors may be as much influenced by social norms and social pressures for many. Even though the uptake to the emergency transport service was low, the JEY complemented the JSY program by providing some of the most vulnerable women transport to a health facility and decreasing the geographical barrier. Nevertheless, there are opportunities to expand the service to more women and improve the time it takes to reach the health facility. OOPE is still prevalent among women who deliver under the JSY program. However the cash incentive was large enough to defray the OOPE enabling the poorest women to have a net gain. The program seems to be effective in providing financial protection for the most vulnerable groups (i.e. women from poorer households and disadvantaged castes).

Keywords: Cash incentive, Maternal Health, India, Social Norms, Emergency Transport, Out-of-pocket expenditures, Janani Suraksha Yojana, Determinants

LIST OF SCIENTIFIC PAPERS

- I. **Sidney K**, Diwan V, El-Khatib Z, De Costa A. India's JSY cash transfer program for maternal health: who participates and who doesn't--a report from Ujjain district. *Reprod. Health.* 2012;9(1).
- II. **Sidney K**, Tolhurst R, Jehan K, Diwan V, De Costa A. 'The money is important but all women anyway go to hospital for childbirth nowadays' - a qualitative exploration of why women participate in a conditional cash transfer program to promote institutional deliveries in Madhya Pradesh, India. *Manuscript*.
- III. **Sidney K**, Ryan K, Diwan V, and De Costa A. An innovative state-led public-private emergency transportation service to reduce maternal mortality: A study of the Janani Express Yojana in Madhya Pradesh, India. *PLoS One* 2014, 9:e96287.
- IV. **Sidney K**, Salazar M, Marrone G, Diwan V, DeCosta A, Lindholm L. Out-of-pocket expenditures for childbirth in the context of the Janani Suraksha Yojana (JSY) cash transfer program to promote facility births: Who pays and how much? Studies from Madhya Pradesh, India. *Manuscript*.

These papers will be referred to by their roman numerals (I-IV) in the text.

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LIST OF ABBREVIATIONS

ASHA	Accredited Social Health Activist
ANC	Antenatal care
ANM	Auxiliary Nurse Midwives
APL	Above Poverty Line
BPL	Below Poverty Line
CCT	Conditional Cash Transfer
DSF	Demand-Side Financing
EmOC	Emergency Obstetric Care
GDP	Gross Domestic Product
INR	Indian Rupees
JEY	Janani Express Yojana
JSY	Janani Suraksha Yojana
KM	Kilometers
MP	Madhya Pradesh
NHM	National Health Mission
NRHM	National Rural Health Mission
OOPe	Out-of-pocket Expenditures
PPS	Probability proportion to size
REDCap	Research Electronic Data Capture
TBA	Traditional Birth Attendant
UN	United Nations
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
WWGD	Where Women Go to Deliver
WHO	World Health Organization

1 INTRODUCTION

1.1 MATERNAL MORTALITY – GLOBAL AND INDIA

In 2001, a renewed emphasis was placed on reducing maternal mortality through the adoption of Millennium Development Goal (MDG) 5 (75% reduction in maternal mortality ratio (MMR) by 2015). This was extremely appropriate as an estimated 286,000 women die annually world-wide from pregnancy-related complications.¹ 99% of all maternal deaths occur in low-income countries, six countries contribute to more than half of these deaths. One-fifth of global maternal deaths occur in India alone making this a serious public health challenge.²

Although many MDGs were met, some such as MDG5 saw significant progress but did not meet its target. The sustainable development goals (SDGs) build on the MDGs' foundation however, unlike the MDGs, the SDGs do not designate a separate goal specifically for maternal health. Instead maternal health has been incorporated into a broad goal to improve overall health and well-being (SDG 3). Nevertheless the focus on maternal health remains a priority for the global community as this goal calls for a reduction in the global MMR to less than 70 deaths per 100,000 live births, from the current global MMR of 210, by 2030.³

1.2 BRIEF HISTORY OF THE SAFE MOTHERHOOD MOVEMENT

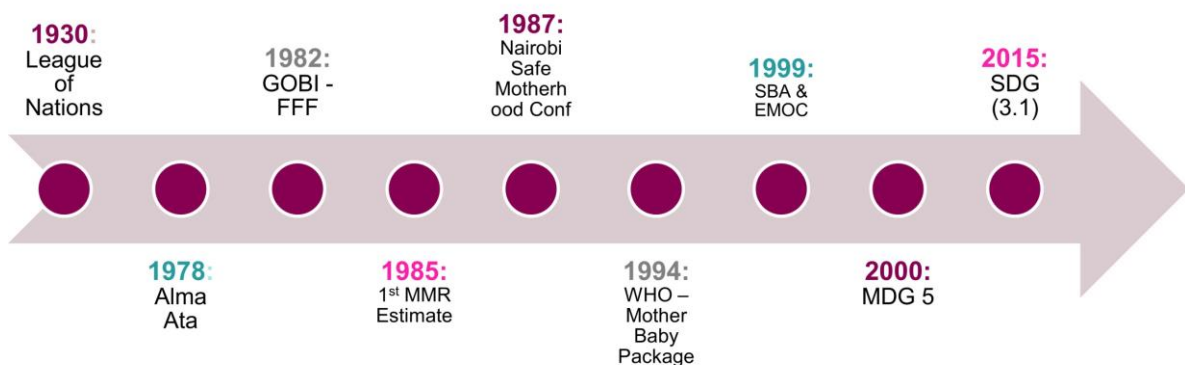


Figure 1: Timeline of the Global Safe Motherhood Movement

As depicted in figure 1, global interest in safe motherhood predates both the MDGs and the SDGs.⁴ The League of Nations health section highlighted concerns about high maternal mortalities as early as 1930. High-income countries wanted to implement health practices to help reduce MMR in their colonies. However it became apparent that transferring health care models to low-income countries would not be effective. This gave way to the 1978 Alma Ata International Conference on Primary Health Care co-sponsored by World Health Organization (WHO) and United Nations Children's Fund (UNICEF). Countries pledged to develop all-inclusive health strategies that focused on provision of service but also the underpinnings of social, economic and political causes of ill-health. However, Primary Health Care never became a reality as it was found to be too expensive. Instead vertical programs ("selective primary health care") with readily measurable outcomes like childhood immunization were adopted.⁵ At the same time, the global community became increasingly concerned with the growing population especially in low-income countries. The UNICEF initiative (GOBI-FFF; growth monitoring, oral rehydration, breast-feeding and immunization

- female education, family spacing and food supplementation) was launched in 1982.⁶ Then, in 1985, the WHO produced the first ever global MMR estimates and estimated that half a million maternal deaths occurred every year, 99% of them in low-income countries. In 1987, the first international Safe Motherhood Conference took place in Nairobi. Through-out the 1970s and 1980s, a key perception began to emerge pertaining to the lack of focus given to women's health within the context of Mother and Child Health (MCH).⁷ In the 1990s, human rights activists started to actively highlight the fact that pregnancy was not a disease, thus maternal deaths could not be viewed in the same light as other deaths caused by disease and ill-health. Women were being discriminated against since no action was being taken to reduce maternal deaths which of course only women would face. By raising this argument, activists were trying to hold governments accountable for their actions/inactions. Throughout this period, international organizations continued to promote safe motherhood initiatives. The WHO published a 'Mother Baby Package' in 1994 which consisted of 18 simple interventions to reduce maternal and infant mortality in poor settings. Subsequently the WHO issued a statement in 1999 discontinuing their support for training traditional birth attendants (TBAs) as there was no evidence to support that TBAs could contribute to the reduction of MMR.⁸ Instead experts began to advocate for increasing skilled birth attendance (SBA) and access to emergency obstetric care (EmOC) in the case of complications.

1.3 STRATEGIES TO REDUCE MMR

Experts argue one of the reasons why MDG5 failed to meet its target was because several different factors contribute to poor maternal health, not just health system issues but also a broad range of socio-cultural, political, economic, physical (geographic) and educational issues. It is complicated and no 'silver bullet' exists to solve the problem. Further, the causes of maternal death are so diverse that no one intervention could address the range of causes. For example, while postpartum hemorrhage is estimated to be the most common cause of death, among Indian women as well, it only accounts for less than a third of all deaths and to treat it an array of interventions such as oxytocic drugs, manual removal of placenta, blood transfusion and hysterectomy are needed.⁹

Skilled Birth Attendance (SBA): The presence of a skilled attendant at the time of birth is a key strategy to reduce MMR. SBA is defined as the process by which a woman is provided with adequate care during the intrapartum and early postpartum period.¹⁰ While there are varying definitions for what is considered a "skilled" attendant, the term usually includes all auxiliary nurse midwives (ANM), nurses, midwives and clinicians.¹¹ Evidence of the effectiveness of SBA historically comes from high-income countries but there is also support from more recent reviews in low-income countries.¹²⁻¹⁵ A few ecological studies reported no or an inverse relationship between SBA and MMR.^{16,17}

Emergency Obstetric Care (EmOC): This is defined as a set of key lifesaving interventions that should be available in health facilities used to treat obstetric-related emergencies. The UN and WHO recommend the following signal functions; (1) the administration of parenteral antibiotics, (2) parenteral oxytocics, (3) parenteral anticonvulsants, (4) manual removal of placenta, (5) retained products, (6) assisted vaginal delivery, (7) ability to perform caesarean section, (8) blood transfusions and (9) neonatal resuscitation. Evaluation of the performance of these signal functions in the last three months is often used as a proxy for level of service

provision and quality of care. A basic emergency obstetric care facility is one in which basic functions (1-6) are performed and a comprehensive emergency obstetric care facility has all the basic functions plus 7-9.¹⁸ Intervention studies and a systematic review found access to EmOC reduces MMR.¹⁹⁻²¹ Given that life-threatening complications occur unpredictably, it is important for women to have access (through direct or referral) to EmOC.²²⁻²⁴

Antenatal Care (ANC): While there is no set definition for what constitutes ANC, most experts agree it includes a wide range of targeted preventive and curative interventions.²⁵ Researchers began to question the role of ANC in reducing MMR in the early 1990s.^{25,26} Evidence from a randomized control trial shifted the approach of ANC to be more focused within fewer visits (only four).²⁷ While ANC serves to improve the health of both the mother and child, alone it has limited potential to reduce MMR. Further the use of ANC to determine high and low risk pregnancies for facility-based deliveries has proven not to be effective.^{28,29}

Family planning: Primary prevention through family planning for unwanted pregnancies has been demonstrated to reduce MMR. While women who are very young, old or have a higher parity are at risk for maternal death, the relationship between family planning and reduction of MMR among this group is mixed.^{30,31} Campbell et al. suggests between 25% and 40% of all maternal deaths could be avoided if unplanned and unwanted pregnancies were prevented.³²

Safe abortion: Induced abortions can occur when unwanted pregnancies are not prevented. Medical abortions in a safe environment have significantly lower mortality than unsafe abortions, contributing an estimated 330 deaths per 100,000 induced abortions. However, in some countries the legal, political and religious contexts severely inhibit women from accessing safe abortions.³²

According to Campbell et al., the strategies mentioned above alone do not provide the ‘silver bullet’ to reduce maternal deaths.³² Thus a facility-based intrapartum care strategy is the ‘best bet’ to reduce maternal mortality as it enables access to both SBA and EmOC. Evidence suggests facility-based intrapartum care can prevent a large proportion of maternal deaths and has the power to bring MMR below 200 per 100,000 live births.^{33,34} The facility-based intrapartum care strategy has been adopted by many governments in low- and middle-income countries, especially in South Asia.³⁵

1.4 MATERNAL HEALTH CARE AND INSTITUTIONAL DELIVERY IN INDIA

The health system in India comprises a mix of public and private providers (for profit and not for profit). The public sector in rural areas consist of a three-tier structure; (i) at the lowest level, a sub-center (SHC) run by a female health worker; (ii) at primary level, a Primary Health Center (PHC) with a medical officer and other paramedical staff; and (iii) at secondary level, a Community Health Center (CHC) with obstetric specialists and inpatient beds. Tertiary care is provided by the district hospital. There is a large deficit of medical professionals in the public sector, the current doctor-population ratio is 0.5 doctors per 1,000 population which is half the WHO recommendation.

Initially rural health services were established with PHCs and SHCs. The PHCs had a trained nurse midwife but SHCs were staffed by locally recruited women with only a short period of

training. The latter were later recruited as regular staff called auxiliary nurse midwives (ANM). However, intrapartum care was provided mostly by untrained TBAs (*dai*). From 1992 to 1997, these TBAs were trained within a program called Child Survival and Safe Motherhood (CSSM) supported by the World Bank and UNICEF.³⁶ It was designed to provide both child survival (e.g. immunization, treatment for diarrhea, and acute respiratory infection control) and safe motherhood services (e.g. referral systems, tetanus immunization, prevention of anemia, ANC, delivery by trained personnel, promoting institutional deliveries, and birth-spacing) through the PHCs.

CSSM was followed by Phase 1 of the Reproductive and Child Health Program (RCH-1, 1997–2004)³⁷, supported by the World Bank. It was then strengthened and enhanced as Phase 2 (RCH-2, 2005–2010) and placed under a new government initiative - the National Rural Health Mission (NRHM). The NRHM, a seven-year (2005-2012) initiative to increase public-health spending, provided substantial additional funding and gave high priority to revamping rural health systems. Under the NRHM, the government fully embraced the facility-based intrapartum care strategy to reduce maternal mortality.³⁸ One of the objectives for the RCH and NRHM programs was to strengthen facilities to enable capacity and provision for EmOC as well as other maternal health services like treatment of RTIs, safe abortion services, and family planning. The National Health Mission (NHM) replaced NRHM in 2013 and continues to focus on the rural but also the urban areas.

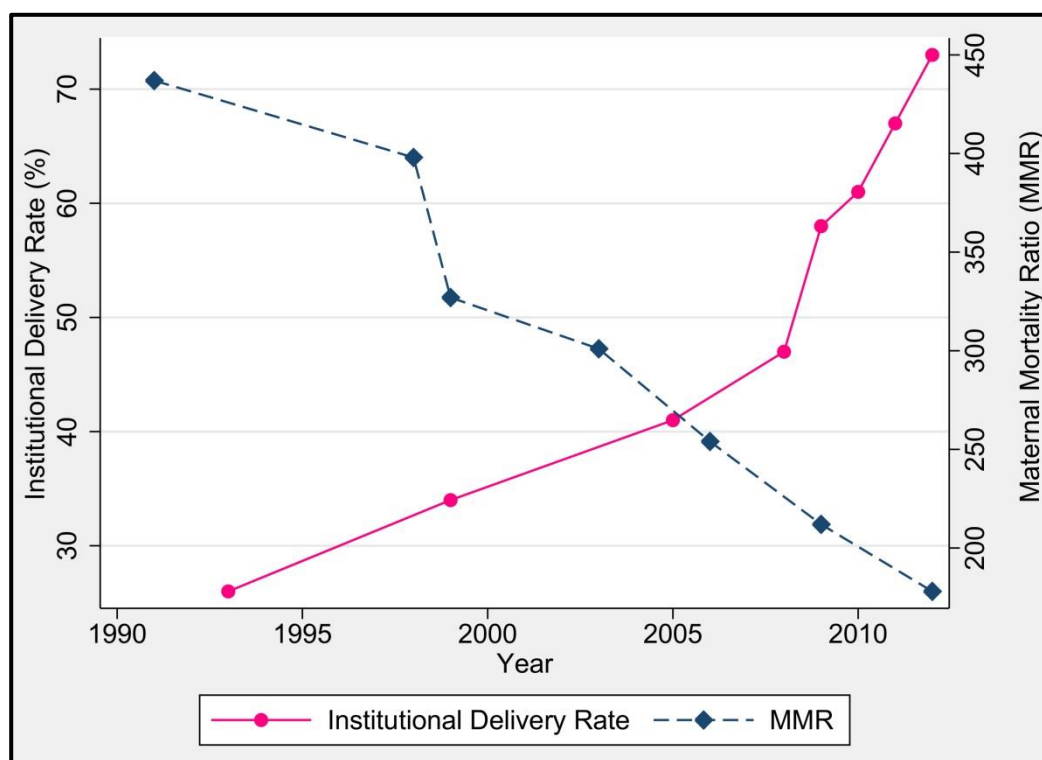


Figure 2: Institutional Delivery Rates and MMR in India from 1991-2012^{39,40,93,145,167,168}

Despite these efforts to strengthen health facility capacity, the proportion of institutional deliveries in India barely increased one percentage point over a decade and a half from 26% to 39% during 1992-2006.^{39,40} Thus, a majority of Indian women continued to deliver outside facilities, increasing their risk of maternal death. While it was extremely important for India to invest in and make EmOC facilities available, developing strategies that increased the use

of these services especially among the poor, who suffer the largest burden of maternal death, was equally significant.

1.5 DEMAND-SIDE FINANCING INTERVENTIONS

Demand-side financing (DSF) is a comprehensive umbrella term given to interventions that funnel government or donor funds directly to the user promoting a desired behavior. DSF initiatives are specifically intended to reduce access barriers for vulnerable groups by giving them purchasing power to use a designated service.²³ Most DSF programs take the form of either ‘consumer-led’ (e.g. vouchers, conditional cash transfers (CCT), tax rebates) or ‘provider-led’ (capitation payment, referral vouchers). Vouchers and CCTs are two of the most common approaches.⁴¹ Vouchers are used to reduce the direct costs of healthcare, thereby increasing the demand for services. Vouchers tend to be cashless, in contrast a CCT bestows a financial incentive directly to the beneficiary but only if recipients conform to a certain set of prerequisites or perform a desired behavior.^{42–44}

Due to the debt crisis in 1982, the Latin American economy stagnated, household incomes drastically dropped and unemployment rose to unprecedented levels.⁴⁵ In the mid-1990s, in light of the extreme poverty and social inequalities, several governments in the region deployed CCTs to create demand for certain services.^{44,46} The objective of the CCTs was to disrupt the intergenerational diffusion of poverty by making payments conditional upon complying with a desired short-term action which in turn had positive long-term consequences.⁴⁷ Most of these programs focused on vulnerable groups and targeted areas like education and nutrition but *not* maternal health. Brazil and Mexico were among the first countries to launch CCTs. The largest program, PROGRESA (renamed OPORTUNIDADES in 2001) in Mexico, provided cash to families to increase access to education, health and nutrition services for children.⁴⁸ Similar programs were launched in Honduras⁴⁹, Nicaragua⁵⁰, and Colombia⁴⁹. It was not until the early 2000s that CCTs for maternal health emerged, mostly in South Asia.³⁵ Similarly, CCTs were implemented within Sub-Saharan Africa (Eritrea, Senegal, and Mozambique), Afghanistan, Bolivia, and the Philippines as well.^{51,52} A recent review of CCTs for maternal health in South Asia found evidence of increased utilization of services in India, Pakistan, Bangladesh and Nepal from CCTs.³⁵ While it is clear CCTs improve utilization of services, it is less clear how this translates to better nutritional outcomes or improved school scores.⁵¹ There is less ambiguity around the effect of CCTs on the reduction of maternal mortality, to date there has been no evidence of an effect.^{53,54}

1.5.1 Conditional Cash Transfer Program - Janani Suraksha Yojana (JSY)

So, despite the Indian government’s investment between 1992 and 2006, facility-based delivery rates remained at 39%. Thus, with strong evidence emerging that access to SBA and EmOC could lower MMR, the government decided to actively draw women into health facilities by incentivizing them financially.

Janani Suraksha Yojana (JSY Safe motherhood program) was launched by the central Government of India under the NRHM. JSY, implemented throughout all of India, pays women a fixed sum when they give birth in a public facility (PHCs, CHCs, or a district hospital).⁵⁵ The states were classified as either low- or high-performing based on their facility-based delivery rate in 2005. In low-performing states, all women were eligible for the

program regardless of their parity or poverty status. However, in high-performing states, the incentive amount is less (about half) and was restricted to women living below the poverty line (BPL) or from socially disadvantaged communities.

The original program implemented in 2005 had different conditions than it does today. In some states, the benefit was restricted to women over 19 years old and up to the second child. However this was later removed as a result of opposition from advocacy groups. Receiving the benefit was also supposed to be dependent upon completion of ANC check-ups. However, due to feasibility issues, this was also rarely observed as a conditionality criterion and was subsequently removed. In Madhya Pradesh, where this thesis is set, rural women receive \$28 (1400 INR) whereas urban women receive \$20 (1000 INR) upon discharge from a public health facility for childbirth.

There were private partnerships under JSY where women could deliver in an accredited private health facility and still receive the benefit. However very few JSY deliveries occur under this partnership and the program has largely been implemented through the public sector.

All services provided in the public health sector are free of charge to the end user. Though not explicit, the cash transfer is not conceptualized by the government as a means of limiting out-of-pocket expenditures (OOPE) or reducing access barriers in anyway, but rather an incentive. However one could conceptualize the cash paid out as being construed by women/families as a facilitator to reducing OOPE and financial access barriers.

In the ten years since the program began, institutional delivery rates have increased to 74% and more than 106 million women have benefited with the government of India spending 16.4 billion USD on the program.⁵⁶⁻⁵⁸

1.5.2 Accredited Social Health Activist (ASHA)

A core initiative of NRHM was to provide improved access to maternal-child health care at the community level through trained, female, village-level health workers selected by the community, known as Accredited Social Health Activists (ASHAs). The ASHA cadre was implemented in 2009 and women were selected from their own village. ASHAs are expected to act as health activists within their communities and are responsible for providing information, creating awareness about key public health services, and mobilizing the community to access reproductive and maternal and child health services. The ASHAs play an important role in the implementation of JSY as they are incentivized to accompany the women to a public health facility. Although ASHAs are considered volunteers and are not formally government employees, the Government of India has introduced a performance-based payment method to support them in achieving defined health objectives. This system is incentive-based: it links the amount of remuneration to the activities completed by the ASHAs. While the ASHA receives the most compensation for accompanying women to a public health facility under the JSY program, she is also compensated for other activities within the community (i.e. motivation for tubal ligation/vasectomy, immunization session, Pulse Polio Day, organization of village health nutrition day, Directly Observed Treatment Short Course (DOTS) for tuberculosis, promotion of installing household toilets, detection,

referral, confirmation, and registration of leprosy cases).⁵⁹ Currently, there are 847,213 ASHAs active in India and 55,541 in the state of Madhya Pradesh.⁶⁰

1.5.3 Emergency transportation: Janani Express Yojana (JEY)

So while the JSY reduced financial access barriers, after the initial years of implementation, the government saw that geographic access barriers significantly limited uptake of facility-based delivery. Transportation was important to bring women into the facility, thus the Madhya Pradesh Government introduced a free emergency transportation system (Janani Express Yojana, JEY)

to offer transport for all women to public institutions for delivery. JEY is a large public-private collaboration used to exclusively transport obstetric cases to public facilities. Active in all of Madhya Pradesh since 2009, the state enters into agreements with district-based private



Image 1: An ambulance/referral vehicle under Janani Express Yojana

contractors to run the transport service in each district. The basic vans are based at different facilities through-out the district and are run by local contractors. JEY utilizes a decentralized call center, manned by district health staff to dispatch the vehicle when needed.

1.5.4 Indian Maternal Health Financing

The total health-care spending (public and private) is 6% of India's gross domestic product (GDP). Between 1991 and 2005, health care spending from the public sector was only 0.9% of GDP. Since the implementation of NHRM, it has increased to 1.2% of GDP. The Government of India has committed to increasing the spending to 2-3% by 2017.

In the meantime, Indian households continue to spend a disproportional amount of their income on health-care through out-of-pocket expenditure (OOPE): 71% of health care is financed by out-of-pocket payments at the point of care.⁶¹ These payments are the fundamental source of inequity in health-care financing and financial risk protection.⁶² High OOPE make health services, including delivery care, difficult to access for a large proportion of India's population. Thus, poor women, who have the least access to such care, bear a disproportionate burden of maternal mortality. For example, in 2005, institutional delivery was nearly 6.5 times higher among women belonging to the highest income quintile (84%) as compared to the poorest quintile women (13%).⁶³ Financial access barriers have made a significant contribution to this inequitable access to health services.

Studies have shown that the JSY program has decreased the inequality in access to institutional delivery among the most vulnerable and poorest groups.⁶⁴ However, less is

known about OOPE in the context of the cash transfer program and more specifically between different economic groups. The JSY program assumes that, in addition to the cash incentive, women will receive a free delivery. However, reports suggest that OOPE for childbirth in the public sector is very common in India.^{65–69} Further, although research cites financial access as a key barrier to institutional delivery, there are few studies that estimate the OOPE occurring at home.⁶⁷ Previous studies suggest a considerable proportion of Indian women report financial access barriers as one of the main reasons for not having an institutional delivery.^{70–72}

1.6 WHAT DOES THIS THESIS FOCUS ON AND WHAT DOES IT CONTRIBUTE?

With the exception of India and Nepal, there have been very few large-scale, government-run, national or regional level DSF programs to increase facility-based deliveries.⁴⁹ The JSY program is one of the first and the largest in the world. When this thesis was proposed, there were few research reports on it. Previous assessments had been descriptive⁷³, process-oriented in some states⁷⁴, or based on secondary data sources⁵² that did not focus on the women's or communities' perspective. Little had been written about the factors that influenced participation or access to the JSY program for women. Further, no studies had looked at the reasons why women chose to participate in the program, how an emergency transport model improved physical access to health facilities, or the amount of OOPE among women participating in the program or at home.

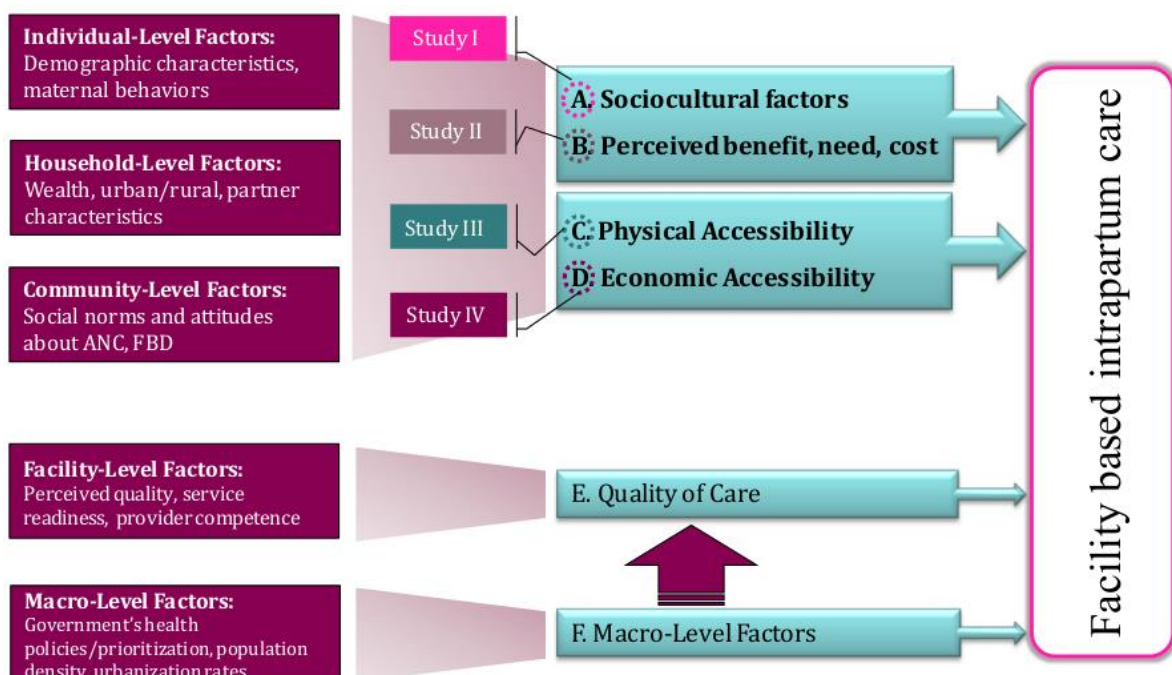
Study I determines the extent of JSY program uptake and the factors associated with participation and non-participation among women who delivered at home or in a private health facility. At the time of conception of this thesis, this study was one of the first to assess not only predictors of and reasons for program participation but also non-program participation. Since then, few studies have corroborated my initial work.^{73,74} Study II aimed to understand and interpret both JSY participants' and non-participants' experiences, perceptions, and motivations regarding place of delivery. In particular, we explored the role of the cash incentive and other elements of the JSY program, including community mobilization, to help elucidate reasons for delivering (or not) in public sector facilities. This is the first attempt to qualitatively study the reasons for program participation. Study III assessed the uptake of, and equity in access to, the emergency transportation model (JEY) that was implemented in response to geographical access barriers faced by women while trying to participate in the JSY program. While other reports were based on small case studies,^{75,76} this is the first research study on JEY with large primary data collected from users. Study IV assessed OOPE among JSY beneficiaries and compared this OOPE to that incurred by women who delivered at home. The extent to which the JSY cash transfer covered OOPE for JSY beneficiaries, predictors of OOPE, and how OOPE varies with wealth status were also studied. Although there are now a number of reports on the JSY^{53,54,64,77,78}, none focus on OOPE in the context of high JSY program uptake.^{65–69,79} The magnitude of OOPE incurred among these JSY beneficiaries is unknown. Further, this is the first study to model OOPE predictors among JSY beneficiaries and home deliveries.

2 CONCEPTUAL FRAMEWORK

The following is an overview of the conceptual framework used to guide the work on this thesis. The framework in figure 3 was adapted from the project, *Where Women Go To Deliver (WWGD)*.⁸⁰ WWGD was implemented to study factors that influence institutional delivery and whether increases in these deliveries improve maternal and neonatal outcomes on a global scene. Their framework is based on the Three Delays Model first introduced by Thaddeus and Maine⁸¹ and subsequently expanded on by Gabrysch and Campbell⁸² to include five major drivers of delivering in a facility: 1) socio-cultural factors; 2) perceived benefit/need/cost; 3) economic accessibility; 4) physical accessibility; and 5) quality of care. The Gabrysch and Campbell framework provided a foundation for the WWGD group and it was built on with the assumption that individuals are influenced by and interact with the contexts within which they live, including but not limited to their households and communities. The WWGD model includes different levels of drivers at the individual, household, community, facility and macro level that are interlinked to influence institutional deliveries: individual factors (i.e. demographic characteristics and maternal behaviors); household-level factors (i.e. wealth, urban/rural and partner characteristics); community-level factors (i.e. social norms, attitudes about antenatal care and institutional deliveries); facility-level factors (i.e. perceived quality and provider competence); and macro-level factors relating to policies that promote institutional deliveries. Studies of the determinants of facility-based deliveries concentrate on sociocultural and economic accessibility variables and often neglect variables of perceived benefit/need and physical accessibility.⁸²

Since one of the main objectives of the JSY program was to increase institutional delivery, we felt it was appropriate to use this framework to conceptualize our studies within the context of the program. The studies in this thesis correspond with factors A-D, respectively.

Figure 3: Conceptual framework of drivers for institutional deliveries



3 RATIONALE AND RESEARCH QUESTIONS

As discussed in section 1.6, there are some gaps in the literature pertaining to the JSY program. This thesis aims to help fill some of those knowledge gaps. Based on the framework in figure 3, I have created a conceptual framework for this thesis (figure 4) in order to: explore the different drivers underpinning JSY participation; specifically, *who* is participating in the program and *why*; understand the role of an emergency transport service to help reduce physical access barriers under the JSY program; and study OOPE among JSY beneficiaries and women who delivered at home.

3.1 RESEARCH QUESTIONS:

Socio-cultural factors and perceived benefit, need and cost

- Who participates in the cash incentive program (JSY) to promote institutional delivery and reduce maternal mortality? (Study I)
- Who does not participate in the JSY program? (Study I)
- Why do women participate (or not) in the JSY program? (Studies I-IV)

Physical accessibility

- Do women face physical access barriers to participate in the JSY program? (Studies I, II & IV)
- Who and how many use the free emergency transport model (JEY)? (Study III)
- Is using JEY associated with delayed access to a health facility? (Study III)

Economic accessibility

- How prevalent and how much is out-of-pocket expenditure (OOPE) among women who participate in the JSY program or who deliver at home? (Study IV)
- Does OOPE differ from women who delivered at home? (Study IV)
- Does JSY reduce financial access barriers and to what extent? (Studies I, II, IV)

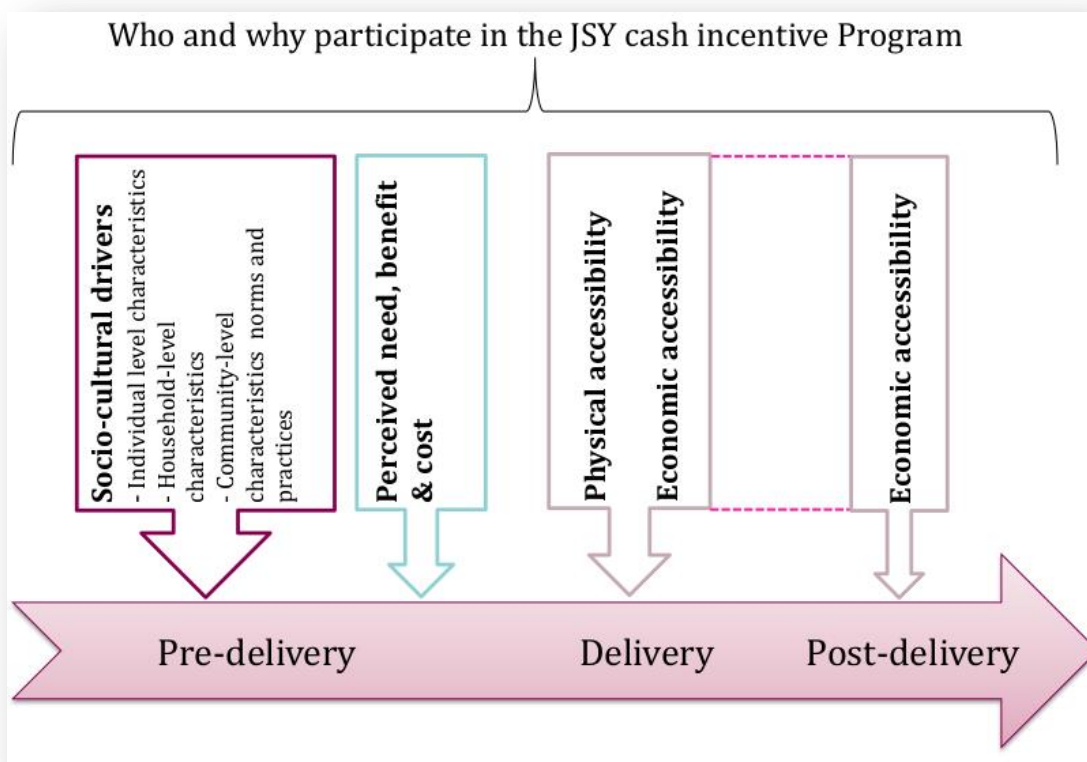


Figure 4: Thesis conceptual framework

Table 1: Study Matrix

	Study I	Study II	Study III	Study IV
Objective	Study the extent of JSY program uptake and the factors associated with not participating in the program	Explore in-depth reasons for participation/non-participation in the JSY program	Study the uptake of, and equity in access to, the emergency transportation model (JEY)	Assess OOPE among women who participate in JSY and deliver at home. Further, to determine the factors and inequalities contributing to the OOPE
Study Design	Population-based cross-sectional survey	In-depth interviews	Facility-based cross-sectional survey	Population-based cross-sectional survey
Study Setting	Ujjain District, DSS Site	Ujjain and Shahdol Districts	Ujjain, Shahdol and Panna Districts	Ujjain and Shahdol Districts
Study Sample	n=418	n=24	n=1005	n=2,607
Outcome and Analysis	Outcome: Place of delivery Analysis: Multi-nominal logistic regression	Analysis: Framework Analysis	Outcome: JEY User, Transport Delay, and EmOC of facilities accessed Analysis: Descriptive, chi-squared, multivariable Poisson regression	Outcome: Part I - Any OOPE, Part II – OOPE >\$0 Analysis: Part I - Logistic regression, Part II - Generalized Linear Model with a negative binominal distribution

JSY: Janani Sureska Yojana, DSS: Demographic Surveillance Site, JEY: Janani Express, EmOC: Emergency Obstetric Care, OOPE: Out-of-pocket Expenditures

4 METHODOLOGY

The studies that comprise this thesis are nested within a larger EU funded project (EU FP7), MATIND.⁸³ MATIND is an evaluation of two different demand side financing programs (Janani Suraksha Yojana and Chiranjeevi Yojana) to promote institutional delivery. The MATIND project commenced in 2011 and aimed to assess and compare the influence of the two programs on various aspects of maternal health care including trends in program uptake, institutional delivery rates, maternal and neonatal outcomes, quality of care, experiences of service providers and users, and cost effectiveness. In addition to Karolinska Institutet, the project included four other partners: the Indian Institute of Public Health, Gandhinagar, Gujarat, India; R.D. Gardi Medical College, Ujjain, Madhya Pradesh, India; Zhejiang University, China; and Liverpool School of Tropical Medicine, Liverpool, UK. I have therefore had diverse inputs and perspectives from the different partners involved in this thesis.

I would like to point out I use the terms deliver/give birth and delivery/childbirth throughout this thesis. I consider these terms to be interchangeable.

4.1 OVERVIEW OF STUDY DESIGN AND ARTICLES

In public health research, many experts advocate the use of multiple methods to be able to answer the question at hand.^{84,85} Moreover quantitative and qualitative methods are complementary methods that can be used in tandem or sequentially.⁸⁶ In this thesis, I used a combination of quantitative and qualitative methods to address my research questions listed in section 3.1. An overview of the studies is presented in table 1.

4.2 STUDY SETTING

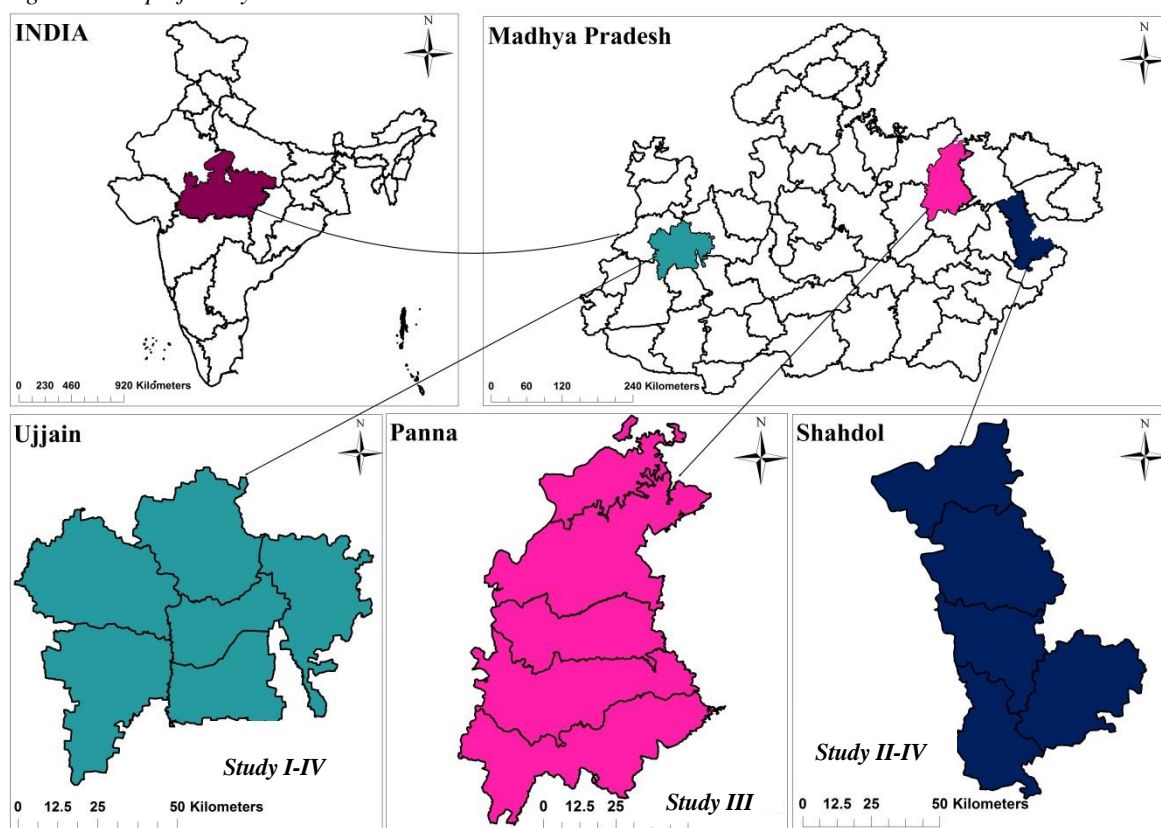
This research was done in India which comprises 35 provinces (locally called states) with varying development levels. Each state is further divided into administrative districts. As shown in figure 5, my studies took place in three districts within the state of Madhya Pradesh.

Madhya Pradesh (MP) is located in the central part of India; 77% of its 72 million population live in rural areas, 31% live below the poverty line (BPL).⁸⁷ MP is the second largest state in India with an area of 308,000 square kilometers (KM). MP has relatively poor health indicators compared to the rest of India: infant mortality ratio (IMR) stands at 65 per 1,000 live births and maternal mortality ratio (MMR) is 277 per 100,000 live births.⁸⁸ The state is divided into 51 administrative districts, each with a population of 1-2 million.⁸⁹ Our study was conducted in three purposively selected districts of MP to reflect different levels of socio-economic development, MMR, JSY program uptakes, and three diverse geographic areas. The characteristics of the three districts are depicted in table 2.

Health facilities conducting deliveries: The public sector manages the large majority of births in my three study districts. A facility-based survey found 86% of all births in the three study districts occurred in public facilities. Two-thirds of these births occurred in facilities that provided less than basic EmOC. While the private sector has the majority of qualified

obstetricians in these districts (87%), the proportion of births conducted there is quite small. The private sector is often clustered in urban areas and not accessible to rural populations.⁹⁰

Figure 5: Map of Study Areas



Since the JSY program is completely funded by the Indian National Government and managed by the state government, we made a formal presentation including the study rationale, objectives, methodology and proposed study districts for the project to key government officials including the Director of the NRHM, Bhopal, and deputy directors of health and family welfare, as well as stakeholders and development partners in the state working with maternal and child health. Formal approval to conduct the study was granted by the Indian Council for Medical Research, Ministry of Health, Government of India, New Delhi, India and also by the state government in MP.

Table 2: Socio-demographic and health characteristics of the three study districts and MP

	<i>Ujjain</i>	<i>Panna</i>	<i>Shahdol</i>	<i>MP</i>
Population (millions)⁹¹	2	1	1	72
Rural Population (%)⁹¹	58	88	71	68
Crude birth rate^{88,92}	23.6	31.3	23.8	24.5
MMR^{93,92}	206	386	415	221
IMR⁹²	54	85	71	62
Institutional Delivery (%)⁹²	85	78	60	83
JSY Uptake⁹²	72	71	55	71
HDI^{94,95}	0.626	0.479	0.6564	0.375

MP: Madhya Pradesh; MMR: Maternal Mortality Ratio; IMR: Infant Mortality Rate; JSY: Janani Suraksha Yojana; HDI: Human Development Index

4.3 DATA COLLECTION METHODS AND ANALYSIS

In 2011-2014, I spent several months in India, planning the studies with the team, designing instruments, training field workers, visiting the study areas (participants' homes and health facilities) as well as the surrounding areas to better understand the local Indian context and setting.



Figure 6: Timeline for data collection points

4.3.1 Study I: Community-based Survey – Exploratory Study

In study I, we assessed the extent of JSY program uptake and the factors associated with not participating in the program. This was the first exploratory study performed under the MATIND project⁸³ which was carried out from January to May 2011 (figure 6). It was conducted in a demographic surveillance site (DSS), the Palwa Field Laboratory, which has been under the routine surveillance of the Department of Community Medicine, R. D. Gardi Medical College, Ujjain since 1999. The Palwa DSS monitors individuals and households with regard to births, deaths, and migrations. Data is also collected on a range of socio-demographic characteristics like age, sex, education, marital status, and household wealth. Regularly scheduled rounds of data collection occur to monitor any changes that may occur to this population over time.⁹⁶

The site included 60 villages, covering 14,858 households with a population of 71,306. The



Image 2: Study participant after the interview

villages are situated in three different blocks (i.e. sub-division of a district used for planning and development purposes) out of six within the Ujjain district. The villages were stratified by block and then we randomly selected 10 villages from each block (30 villages in total) by using computer generated randomization. Records of all births and deaths in these villages were

routinely maintained by the

DSS staff at the college. This information was made available to the research team and served as the starting point for the study. We identified 742 women in the selected villages who delivered a child in 2009.

A trained female research assistant, with extensive experience of working in rural communities, and I visited the selected study villages. Village community health workers who collaborate with the DSS helped us identify the residence of each woman on the list. Among the identified women, 418 (56%) were available to participate in the study. It was harvest time, so many of the women were out during the day when the study team and I could travel to the villages. The research assistant administered the questionnaire in Hindi to the mother in her home which comprised socio-demographic characteristics, place of delivery, and reasons for place of delivery. I accompanied the research assistant on 90% (n=378) of the interviews in the field. On a daily basis, I performed quality assurance reviews on each form throughout the data collection phase.

Analysis – Study I

STATA version 10 (Stata Corporation, College Station, TX, USA) was used for data analysis. The following variables were generated from the questionnaires to be used during data analysis:

Dependent variable

- *Place of delivery*: A categorical variable was created based on the place of delivery: a 'JSY facility' (which was a public facility delivery), 'private facility' or 'at home'.

Independent variables

- *Poverty Level*: This variable was dichotomized into above poverty line (APL) and BPL card holders. The BPL card is issued by the Government of India to designate financially disadvantaged individuals/households. Eligibility for the card is determined by various factors including land ownership, house dwelling, sanitation, food security, household assets, literacy status, livelihood and income. BPL families can benefit from welfare programs.⁹⁷ We did not include enough variables in the questionnaire to allow us to construct a wealth index for each mother. Thus we used the possession of a state-issued BPL card as a proxy for wealth.
- *Caste*: Individual castes were recorded and dichotomized into 'disadvantaged groups' and 'general caste'. The 'disadvantaged groups' included scheduled castes, scheduled tribes and other backward castes. These groups have been historically subject to social disadvantage and exclusion. They were awarded special status by the Constitution of India under a national positive affirmation policy that entitles them to specific social benefits.⁹⁸
- *Number of previous deliveries*: A dichotomous variable for parity was constructed: '1 delivery' was primiparous women while ' ≥ 2 deliveries' was multiparous women.
- *Time spent traveling to place of delivery*: The median amount of time it took for the women to reach the facility was used as the cut-off value. The variable was categorized into above and below the 45-minute median.
- *Prior knowledge of the JSY program*: Prior knowledge was determined if the mothers knew they were entitled to the 1400 INR (i.e. JSY cash transfer) when they gave birth in a public facility. A dichotomous variable was created.

Data was described using contingency tables by place of delivery. Significant differences of proportions were tested using Pearson's chi-squared value for all independent categorical

variables. Since the dependent variable had three outcomes, a multinomial logistic regression was used to study predictors for place of delivery. Independent variables significant at $p < 0.10$ in the bivariate analysis were included in the stepwise forward selection model. Odds ratios with 95% confidence intervals were presented and a value of $p < 0.05$ was deemed statistically significant in the final model. We verified no interaction existed between the variables in the model.

4.3.2 Study II: In-depth Interviews

Study II used qualitative methods and was conducted simultaneously with study III (figure 6), i.e. the data was collected when we were in the field performing the facility-based survey in March 2013. As qualitative studies often do, it expanded our understanding of the findings from studies I, III and IV. We used in-depth interviews (IDI), which were deemed a suitable method to help us understand why women participated or did not.

Participants were both beneficiaries and non-beneficiaries of the program. The beneficiaries were identified through the facility-based survey (study III). A purposive sample of mothers was selected from two study districts (Ujjain and Shahdol) to represent a range of background characteristics including age, parity, distance to the health facility and JSY beneficiary status (place of delivery). These characteristics were selected to ensure we had a range of characteristics known to influence facility-based deliveries.

Two semi-structured topic guides (see appendix 1 and 2) with open-ended questions were developed to conduct the IDIs. The guides varied for women who delivered in a health facility or at home, and were developed based on two sources: (i) close-ended responses pertaining to the rationale for participating or not in the JSY program that were collected in study I and (ii) the current literature on women's perception and satisfaction with participating in a program for maternal health. The topics covered included (1) the process for decision-making regarding place of delivery and ultimately participation in the JSY program; (2) role of transport and the community health worker in deciding the place of delivery; (3) expenses associated with the delivery; (4) specific knowledge of the JSY program and how it influenced the women's decision on where to deliver; (5) perception of the JSY program and how the incentive should be spent; and (6) future delivery plans. The topic guides for women who delivered at home included an additional section on barriers to institutional deliveries. Both guides were pre-tested and then subsequently translated into Hindi and then back-translated for quality assurance purposes.

I interviewed women in their place of residence with the assistance of a local interpreter. The questions were asked in English and then translated into Hindi by the interpreter. All participants responded in Hindi and their responses were translated back to English. At the beginning of the interview women were encouraged to share their pregnancy and delivery experience from the birth planning to after the delivery. This was intentional to build some rapport with the interviewee and create a relaxed atmosphere where they felt comfortable sharing their experiences. I probed when appropriate, specifically around their rationale for participating or not in the JSY program, facilitators for participation, barriers to desired uptake or reasons for preferential non uptake of the program. I also encouraged women to be forthcoming with their experience and perception of the JSY program including the adequacy of the cash incentive, process in obtaining the incentive, its specific role in motivating women

to deliver in health facilities and the perceived outcome of participating in the program. I often revisited these areas at the end of the interview when the women felt more comfortable and understood the purpose of the interview.

The data collection ceased once we reached the ‘topical saturation’⁹⁹ point (i.e. I saw that new information had stopped emerging from the interviews and the content reflected similar experiences, rationale and perspectives in the areas of interest). The interviews lasted between 25 and 90 minutes and were audiotaped. All interviews were transcribed in Hindi verbatim and then translated into English. A couple of transcripts were selected for back translation to compare with the audio recording. This was done to ensure the quality of the transcript and on certain occasions clarify ambiguity in a participant’s statement/expression. No major discrepancies were found, thus we felt confident in the accuracy of the translation.

Analysis:

Qualitative framework analysis by Richie and Lewis, a matrix-based approach to structure and synthesize data, was used to analyze the data.¹⁰⁰ First a thematic framework was developed by creating a list of themes and subthemes to index reoccurring concepts and ideas, experiences, processes, behaviors, attitudes, motivations, and beliefs. After discussion, the research team agreed on a set of codes forming the initial analytical framework. Before the indexing



Image 3: Study participants during the interview

process began, each code was given a brief explanatory description of its meaning and examples of what could be summarized under that code to provide consistency during the indexing process. This list became the codes and the data was indexed in Microsoft Word with the codes, illustrating which theme applied where in the data. The final framework consisted of 66 codes, clustered into 12 themes. Three transcripts were independently indexed by two different research team members to increase reliability. To provide a structured manner to view the data, the participants’ responses were charted within the thematic matrix in Excel. We viewed the data vertically through the thematic framework matrix and created category labels to highlight similar views, behaviors, and experiences. The category labels were then used to create the final themes and sub-themes.

4.3.3 Study III: Facility-based Cross-sectional Survey

Study III was a facility-based study performed between February 2012 and April 2013 (figure 6). It was conducted in three different districts and included 11 project staff members and research assistants. The objective was to study the uptake of, and equity in access to the

Janani Express Yojana (JEY) emergency transportation service among women who had an institutional delivery.

Facilities where women gave birth: An initial list of all public and private health facilities that routinely conducted deliveries was obtained from the district health department. These facilities were approached to identify any remaining private facilities that were not on the initial listing. The number of deliveries performed in the previous three months for each of the identified facilities was ascertained. To maximize field resources, we decided to include only facilities that performed more than 10 deliveries a month. See more details on the number of facilities in appendix 3.

Data collection for study participants: A significant amount of time was invested in the



Image 4: Health Facility performing deliveries in study district

development of the study instruments along with standard operating procedures (SOP) to ensure the clarity of each question and uniformity in how the question was administered. Research teams, comprising three or four female research assistants depending on the size of the facility, were deployed. They recruited all women who gave birth in that facility over a

consecutive five-day period. The trained research assistants administered a structured close-ended questionnaire to elicit basic socio-demographic characteristics, transport-related information including delays, pregnancy and delivery details from the mother or a family member.

Analysis - Study III

Data was analyzed in STATA version 12.0 (Stata Corporation, College Station, TX, USA). The following variables were generated from the questionnaires to be used during data analysis:

Dependent Variables

1. *Janani Express Yojana (JEY) User:* Women who used Janani Express to travel to the health facility were classified into 'yes', all others were 'no'.
2. *Transport Delay:* A transport delay occurred when the women reported a time of greater than 120 minutes between *deciding* to leave home and *arriving* at the health facility and the reason stated was related to transport. The rationale for this cut-off was twofold: (i) WHO and UNFPA recommend that women should have access to EmOC within 120 minutes¹⁸ and (ii) it was reported to be significantly associated with in-hospital maternal mortality.¹⁰¹

Independent Variables

- *Education*: It was dichotomized into two groups: low-educated (no education or up to grade five) and high-educated (grade six and above).
- *Caste*: Caste/ tribe reported by the mother was categorized into: general, scheduled caste, other backward castes, and scheduled tribe, as classified by the government list.
- *Distance Travelled*: The distance travelled by each woman was calculated using the geographic information system tool network analysis of the program ArcInfo. The nearest road route distance between the residence of the woman just before delivery and location of the facility using was calculated in KM.
- *ASHA accompanied*: Women were asked if an ASHA had accompanied them to the facility and recorded as a dichotomous variable (yes/no)
- *ASHA arranged transportation*: Women were asked if an ASHA had helped to arrange transport to the health facility,
- *Referred Mothers*: A dichotomous variable (yes/no). These were women who reported visiting another health facility before they gave birth in the current facility.
- *Place of delivery*: was categorized into two groups based on ownership (public or private) and on the administration of the six signal EmOC functions.

Univariate statistics (frequencies, medians and inter-quartile range) were used to describe the study sample, time to reach the facility, cost of transport, and distance traveled. Bivariate analysis (Pearson's Chi-squared test) was conducted to identify correlations between the independent and dependent variables. A Poisson regression with robust confidence intervals was used to generate prevalence ratios (PR) with 95% confidence intervals. As with in study I, we used the value $p < 0.10$ as our cut-off when selecting variables to include in the model. We also used context-specific knowledge. Initially, we contemplated including the variable 'ASHA Arranged Transportation' in the model, however further investigations proved interaction between this variable and several other independent variables (i.e. education, caste, place of residence, and distance to facility). Consequently, we considered the variable 'ASHA accompanied' and upon further analysis found there was no presence of interaction with the other variables. The Pearson's goodness-of-fit test was used to assess and select the best model. To rule out multicollinearity between the several explanatory variables, an assessment of collinearity was conducted using the means of variance inflation factors (VIFs).

4.3.4 Study IV: Population-based Cross-sectional Survey

Study IV was the last data collected in this thesis. It was a population-based study performed between September 2013 and April 2015 (figure 6). Since the main objective of this study was to study differences in and predictors of OOPE between women who gave birth in the JSY program and at home, this study design was deemed appropriate to answer the research question.

Sampling and Data Collection

This study was performed in two of the study districts (Ujjain and Shahdol). All of the administrative blocks of Ujjain district were included, however only two of five (one in the north and one in the south) in Shahdol were included for logistical reasons. A multi-stage sampling technique was used. Villages with extreme population sizes (less than 200 and more than 10,000 populations) were excluded from the sampling framework. The remaining

villages were stratified into two strata using geographic information system tools: villages that were (i) ≤ 5 km or (ii) > 5 km from a public health facility conducting deliveries (these facilities were identified in study III). The number of sample units in each stratum was allocated in proportion to their share of the total population. In order to ensure each woman had the same probability to be selected for the study, villages from each stratum were selected using the population proportionate to size (PPS) technique. In total, 247 villages were selected; 101 and 146 villages within and outside the five-kilometer radius of a facility, respectively.

Some study villages were extremely remote and difficult to access on a regular basis. Thus from the onset of the study, it was decided to use the combination of village surveillance visits and a call center to notify the team when a birth had occurred. The local community health workers (ASHA), local crèche workers, and traditional birth attendants (*Dai*) were incentivized to call a free number to report when a birth had occurred within their village. Informants received \$1.60 USD per childbirth reported. To encourage expedient reporting of the birth, the incentive was paid to the first person who called. Surveillance teams were dispatched monthly to the study villages to ensure all births were recorded. Calls from informants constituted 84% ($n=2334$) of the births, while the surveillance team identified an additional 16% ($n=445$). Among the 2,779 births reported, 94% ($n=2,615$) of the women were recruited.

Analysis- Study IV

Data was analyzed in STATA version 12.0 (Stata Corporation, College Station, TX, USA). The following variables were generated from the questionnaires to be used during data analysis:

Dependent variable:

The main outcome of interest, gross OOPE, was a sum of the following expenditures:

1. *Medicine, supplies and procedures* included delivery costs, medicines, supplies, blood transfusion, diagnostic tests, and anesthesia.
2. *Informal payments* were any expenditure reported as ‘rewards’ paid by the women/families to the staff for assisting their care in the facility. For the women who gave birth at home, cash given to the *dai* (traditional birth attendant who conducts home births) was classified as an informal payment.
3. *Food/Cloth* was food consumed during hospital stay or at home in relation to the delivery and cloths used for the infant. This variable was created from the ‘other category’ of expenses that women reported. Food and cloth items for the infant were the only other costs included in the other category so we decided to make this a separate category.
4. *Transportation costs* included all costs associated with reaching the health facility for delivery.

For part one of the model (described below), OOPE was categorized into a binary outcome of whether women incurred OOPE or not (yes/no). In part two of the model, a subset of women who incurred any OOPE, OOPE was continuous. The women reported the OOPE in Indian rupees (INR) and we converted to US dollars (US\$) using the exchange rate at the time of the study of 60 INR to US\$1.

Independent variables:

- *Place of delivery* was created based on where the women gave birth; either at a public facility and considered a 'JSY beneficiary', or at home, i.e. a 'home delivery'. Some women reported giving birth on the way to the health facility. Since these women received the JSY cash incentive, we included them in the 'JSY beneficiary' group.
- *Age and education* were continuous variables as asked in the questionnaire.
- *Birth order* was grouped into four categories: primiparous (first delivery), second delivery, third delivery and fourth or more delivery.
- *Household wealth*: To construct the categorical variable household wealth, information was collected on 20 household items, the structural type of dwelling, and sanitation arrangements as recommended/used in the National Family Health Survey.⁶³ Principal component analysis was used to calculate a wealth index score on the entire study sample which was categorized into five wealth quintiles.¹⁰²
- *Net OOOPE Gain* was the gross OOOPE minus the value of the cash incentive (\$23).

The total gross delivery expenditure for each mother was calculated. Descriptive statistics including frequencies, median and interquartile ranges were presented for the two groups of women (JSY beneficiaries and home deliveries). Since the OOOPE variable was not normally distributed, we did not present means. The non-parametric Wilcoxon Signed Rank test (for variables with two groups) and the Kruskal Wallis test (more than two groups) were used to detect differences.

Inequality Analysis

Inequalities in OOOPE were analyzed using concentration curves (CC) and the concentration index (CI) as first done by Wagstaff et al.¹⁰³ The CC plotted the cumulative percentage of OOOPE (y-axis) against the cumulative percentage of the women, ordered from the poorest to the richest (x-axis) based on the wealth index variable.¹⁰⁴ The CC graphically displayed the inequalities in OOOPE between JSY beneficiaries and home deliveries. The CI with a range of -1 to 1 quantified the inequality in the OOOPE. CI is defined graphically as twice the area between the concentration curve and the line of equality.¹⁰⁵ A positive value indicates a progressive system where the wealthier women pay a higher proportion of OOOPE compared to the poorer women. A negative value indicates the opposite (and a regressive system).

Multivariable Model

A two-part model is commonly used when studying health expenditures to accommodate the significant number of zeros (no expense incurred) and for its distribution (i.e. right skewed with a long tail). A Poisson distribution was deemed inappropriate since there was a difference in the mean and standard error. The first part, a binary logistic model, was used to understand the predictors associated with *any* OOOPE and estimated the odds of a woman incurring any OOOPE. The second part of the model, a generalized linear model (GLM) with a negative binomial distribution, analyzed a subset of women who reported OOOPE >0 to estimate the OOOPE. We present the coefficients as incident rate ratios and 95% Confidence Intervals. In order to transform the coefficient into an incident rate ratio, we took the exponential form of the logarithm coefficient subtracted from one and multiplied by 100.

Covariates were selected based on previous literature of variables known to influence OOPE and context-specific knowledge. There was no interaction found between covariates. Multicollinearity was assessed by calculating the mean variance inflation factor (VIF=1.53), which did not show evidence of collinearity. In both models, p-values <0.05 were considered significant.

4.4 DATABASE MANAGEMENT (STUDIES I, III AND IV)

EpiData (version 3.1), was used for the data entry and management in study I. It is a free basic database management system that is most often used for simple forms and data entry.¹⁰⁶ The software is downloaded onto a single hard drive. The intuitive user interface made it relatively easy to design and implement a data collection tool. However, while the database itself provided a secure structure to enter data, when I relocated back to Sweden, it proved difficult to access the most-up-to date version of the database on a regular basis. From the experience gained in study I, we knew a robust multi-site system that could handle large amounts of data was needed. Research Electronic Data Capture (REDCap) software was used to create the databases for studies III and IV.¹⁰⁷ The database was hosted online with provisions for double data entry, built-in quality checks, as well as supervisory mechanisms to ensure quality of the data was maintained. A database manager was appointed at the local site. In collaboration with the local database manager and research team members, I developed site-specific SOPs for the collection of research data, transcription of the data to forms, and the management of the data specifically: field data management, flow of data management, log management, procedures for data entry, quality control/quality assurance, data query resolution/error correction, record retention and archiving, data storage and an overall checklist for data collection and data checking. I created the database for study III, while the local database manager created the database for study IV under my supervision.

4.5 ETHICAL CONSIDERATIONS

Ethical approvals were obtained from R.D. Gardi Medical College ethics committee, and Karolinska Institutet. Informed consent explaining the rationale of the study, risks and benefits was administered in a language understood by all participants. All women were given an opportunity to decline participation prior to signing the consent form. If the woman was illiterate, a literate family member or neighbor was sought by the research team. The consent form was subsequently read verbally to the woman, the content of the form was confirmed by the literate family member and a thumbprint from the consenting participant was obtained.

Data protection and privacy: Careful consideration was given to ensuring data protection and privacy of all participants. While developing the database, identifying variables were flagged allowing for the data to be exported anonymously and dissociated from information that could potential identify them. For study II, all interviewees were disassociated from the transcripts before analysis.

5 RESULTS

This section presents quantitative and qualitative findings from studies I-IV, but also includes some findings from unpublished data that further enhances the understanding of the research questions. The conceptual framework presented above is used to help explain the main results and structured as follows: who participates in the JSY program and who does not; why do they participate and why not.

5.1 WHO PARTICIPATES IN THE JSY PROGRAM AND WHO DOES NOT? (I)

Who participates? Program uptake in this setting was high; the majority of deliveries (76%, n=318) in study I took place within the JSY program (i.e. at a public health facility). About half of the JSY beneficiaries had no formal education (n=166), a quarter of them belonged to disadvantaged castes (scheduled castes and tribes and other backward castes) (n=79) and a third were primiparous (n=115). All women who delivered under the program received the cash benefit; 86% received it within two weeks of delivering in a facility.

Who does not? (Table 3)

Non-participants belonged to one of two distinct groups. Above poverty line (APL) women and those belonging to a general caste were more likely to deliver in a private facility versus a JSY public facility. Delivering in a private facility was also significantly associated with having a higher number of ANC visits. Education was not a significant predictor of a private facility delivery. On the other hand, women who were uneducated and multiparous were significantly more likely to deliver at home. Poverty (BPL) was not significantly associated with delivering at home when compared to delivering in a JSY public facility. As depicted in table 3, no prior knowledge of the JSY was highly predictive of delivering in a private facility (AOR: 13.78, 95% CI: 5.23-36.28) or at home (AOR: 11.68, 95% CI: 4.77-28.63).

Table 3: Multinomial logistic regression for factors determining place of delivery

Characteristics	a) Delivery at a private hospital AOR (95% CI)	b) Delivery at home AOR (95% CI)
Disadvantaged groups	0.45 (0.22-0.91)*	0.96 (0.43-2.15)
No formal education	0.51 (0.24-1.08)	2.61 (1.25-5.47)*
Below poverty line	0.44 (0.22-0.89)*	0.81 (0.41-1.59)
Adequate antenatal care	4.55 (2.09-9.91)†	-
No knowledge about JSY	13.78 (5.23-36.28)†	11.68 (4.77-28.63)†
≥ 2 previous deliveries (multiparous)	-	3.00 (1.21-7.25)*

*p-value 0.≤05; †p-value ≤0.001; AOR: Adjusted Odds Ratio

Key results: Who participates or not? (Study I)

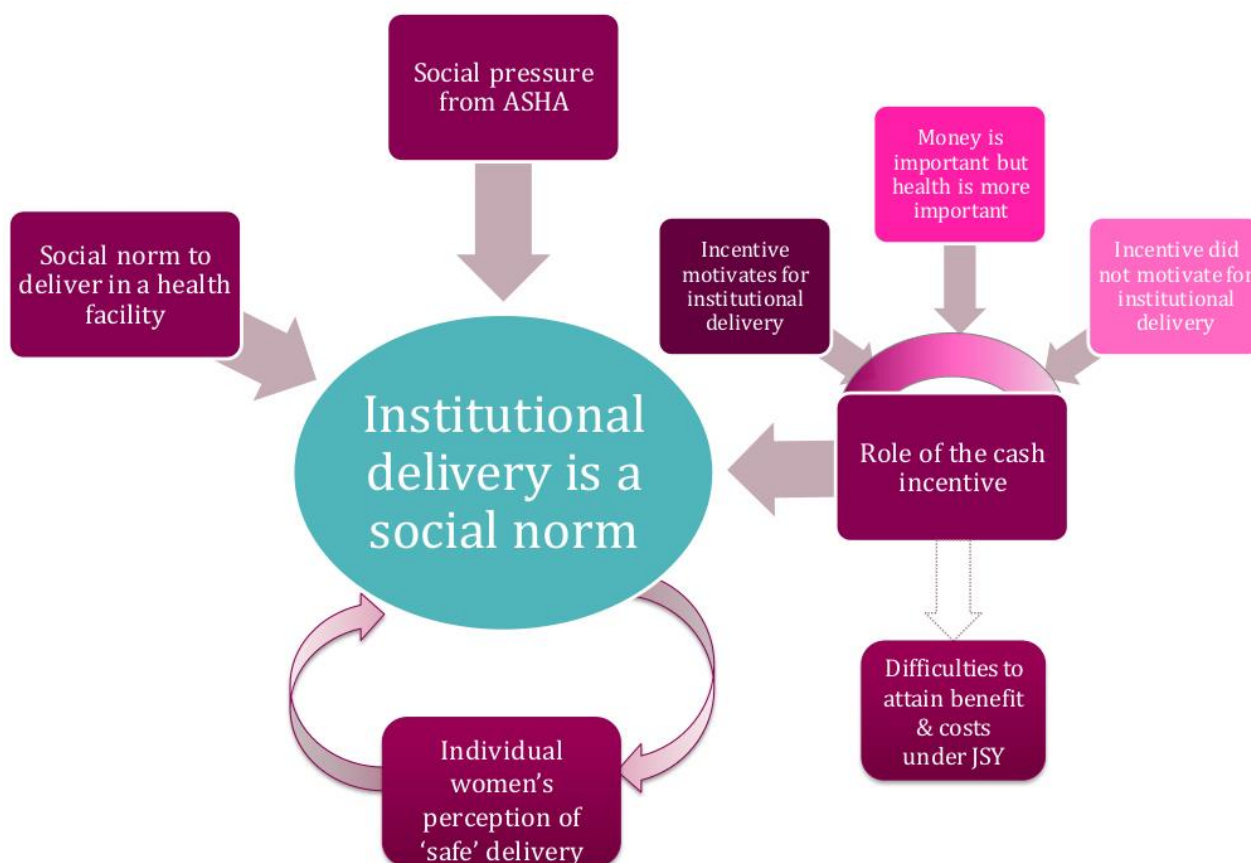
- High program uptake, especially among poorest population (81% of all BPL)
- Lower education, multiparous and no prior JSY knowledge were predictors for home delivery compared to being a JSY beneficiary
- APL women, belonging to a general caste and having ≥ 4 ANC check-ups were predictors to deliver in a private facility
- 86% of JSY beneficiaries received the cash incentive within two weeks of delivery

Box 1: Summary of key results for who participates or not in the JSY program

5.2 WHY DO WOMEN PARTICIPATE IN THE JSY PROGRAM? (I, II, IV)

In study I, 44% of the women motivated their reason for delivering in the program as being based on the close distance of the facility to their home. Only a quarter cited the JSY cash incentive as the main reason and 17% were motivated by the perception that good services were available at the program facility.

Figure 7: Thematic map illustrating why women participate in the JSY program from study II



In study II, we also found some women felt the cash incentive was the main reason to deliver at a JSY facility and it provided a means for a ‘safe’ delivery. However an additional reason emerged: a shift in the social norm of where women should/want to deliver. We identified this shift as one of the key drivers behind their participation in the program (figure 7). As illustrated by this woman, the shift in perception could indicate a new social norm emerging:

“When I was pregnant for the first time; I tried to deliver at home...now everyone [ASHA, dai, sweeper, other village women] says women should deliver in hospital...So I did.” – JSY Beneficiary, Age 24

Another driver described by many women was their perception of the importance for a ‘safe’ and ‘easy’ delivery. It was most likely shaped by the emerging social norm of delivering in a facility but also simultaneously contributed to the development of that norm. Several women, including the one below, particularly stressed a shift towards a commonly held perception of the risks of home delivery if complications occur:

“Women have started changing their decision to deliver at home. Earlier, women never thought like this... People have started thinking that we should go to the hospital for better facilities and free delivery. There is risk in delivering at home. You can’t get good treatment at home. If some women require blood during delivery, it is not available in the village. So, now women are aware and they like to go to hospital for delivery.” – JSY Beneficiary, Age 23

5.2.1 Role of the ASHA enabling JSY program participation (I-IV)

In study I, the ASHA visited a large majority of the women (86%). However she did not help them to decide on where to deliver (17%) or to make transportation arrangements for the delivery (13%) very often. Although one of the stipulations for the ASHA to receive her incentive is to accompany the women to the hospital, only 49% of the women in study I said that the ASHA had accompanied them. By contrast, in study IV, more than half of the women reported that the ASHA had arranged their transportation (51%) and accompanied them to the health facility (57%).

Study II demonstrated that the women felt strong social pressure from the ASHA (both positive and negative) to deliver in a health facility. As illustrated in figure 7, this also probably contributed to the shift in the social norm to have a facility-based delivery. The JSY beneficiaries often described the role of the ASHA as essential in ensuring they delivered in a facility that participated in the JSY program. Whether the assistance was given during the decision-making process, arranging the practical logistics, accompanying them to the facility, facilitating their admission into the delivery ward or interacting with the facility staff on their behalf, the ASHA's input was a clear social pressure for facility use. This woman describes her interactions with the ASHA:

"I have a very good relationship with Asha worker. I was thinking of delivering at home as my three children were born at home but she told me several times that I should go to hospital for delivery where I would get all facilities and get money... If there is some complication during delivery, we will get immediate treatment...I listened to her." – JSY Beneficiary, Age 36

However, some women described the pressure from the ASHA to have a facility-based delivery in negative terms. This perception was particularly strong among the group of women who unintentionally delivered at home. This woman was irritated by the ASHA's reprimanding her for having an unintentional home birth.

"I became angry because she [ASHA] was scolding me...[ASHA said] You should have informed me and now hospital officials will say that I did not bring you in time. Delivery cannot happen so fast..." - Home Delivery, Age 21

The ASHA also played a role in enabling access to emergency transport (JEY) (see section 5.5 for more details).

5.2.2 Role of the cash incentive in influencing program participation (II)

As demonstrated in figure 7, women's perceptions regarding the cash incentive were on a spectrum that ranged from the cash being the absolute motivator for institutional delivery in a JSY public facility to playing no role at all. Some women acknowledged the benefits of receiving cash (i.e. to help supplement their diet with more nutritious yet expensive food or to pay for the informal costs occurred in the facility) but also subsequently stressed the greater reason of wanting to ensure a 'safe' delivery for herself and the child. When asked what the implication of removing the cash incentive would be on women's participation in the program, they expressed a similar spectrum of thoughts. One woman who delivered at home said:

"If the government stops giving money, we should not go to the hospital. If we will not get money, why should we go there? The only reason to go to the hospital for delivery is the money. If government stops

giving money, we would like to deliver at home. We will save a little and deliver at home instead of spending money on giving a reward to the nurse.” Age 23

Another woman presented a contrasting view:

“We will go to the hospital even if we don’t get the money because we go to the hospital for better health and good treatment. Not for the money. If we die without good treatment, what will we do with the money?” – JSY Beneficiary, Age 28

Key results: Why participate? (Study II)

- Women’s increased participation in the program reflects a shift in the social norm
- Drivers of the shift include:
 - Social pressure from the ASHA to deliver in a health facility
 - A growing individual perception of the importance for ‘safe’ and ‘easy’ delivery
- The women had a spectrum of views pertaining to the influence of the cash incentive; it was the most important reason to not a factor at all

Box 2: Summary of key results for why women participate in the JSY program

5.3 WHY WOMEN DID NOT PARTICIPATE IN THE JSY PROGRAM? (I, II, IV)

The women in study I reported the main reasons for delivering at home were non-availability of transportation (65%) or that the mother felt previous deliveries were ‘easy’ and so there was no need (26%). However, by the time we completed study IV in 2014, these reasons had shifted. In study IV, the baby coming unexpectedly and quickly (52%) was the main reason given for home deliveries. Other reasons included; planned to have a home delivery (16%), no one to accompany them to the hospital (10%) and other (6%). Only one woman replied she could not afford to deliver in a health facility. Transportation-related issues were still present, however they had decreased from 65% in study I to 16% in study IV.

In addition, the women from study II reported that non-participation was by and large unintentional and caused by personal circumstances (i.e. the baby came quickly or unexpectedly). This woman contacted the ASHA prior to delivering, but due to a combination of factors (labor starting at night and poor weather/road conditions), it was not possible for her to access a health-care facility (and thus the JSY program) for delivery.

“She [ASHA] asked me to try calling the hospital and she assured me that as soon as the sun rose, she would come to my place. It was night and raining heavily. ASHA can’t come alone at night. There is drainage near our place and when it is full we can’t cross the drain. So, it was impossible for her or any vehicle to come. Before ASHA worker came, I delivered my twins.” – Non-JSY Participant (Home Delivery), Age 20

There were few women who cited poor geographic access and difficulties obtaining transportation in time. One reason emerged from study II that was not present in either studies I or IV. Some women were prompted to be non-participants by a perception of poor quality of care provided in JSY facilities.

Key results: Why not participate? (Studies I, II & IV)

- In study I non-availability of transportation (65%) or that the mother felt previous deliveries were 'easy' and thus no need (26%) were the main reasons
- Reasons had shifted by study IV; the baby came unexpectedly and quickly (52%), planned to have a home delivery (16%), transportation related issues (16%), no one to accompany them to the hospital (10%) were the main reasons.
- Women from study II reported that non-participation was by in large unintentional and caused by personal circumstances, physical access barriers, or a perception of poor quality of care provided in JSY facilities.

Box 3: Summary of key results for why women do not participate in the JSY program

5.4 ROLE OF JEY ENABLING JSY PROGRAM PARTICIPATION (III)

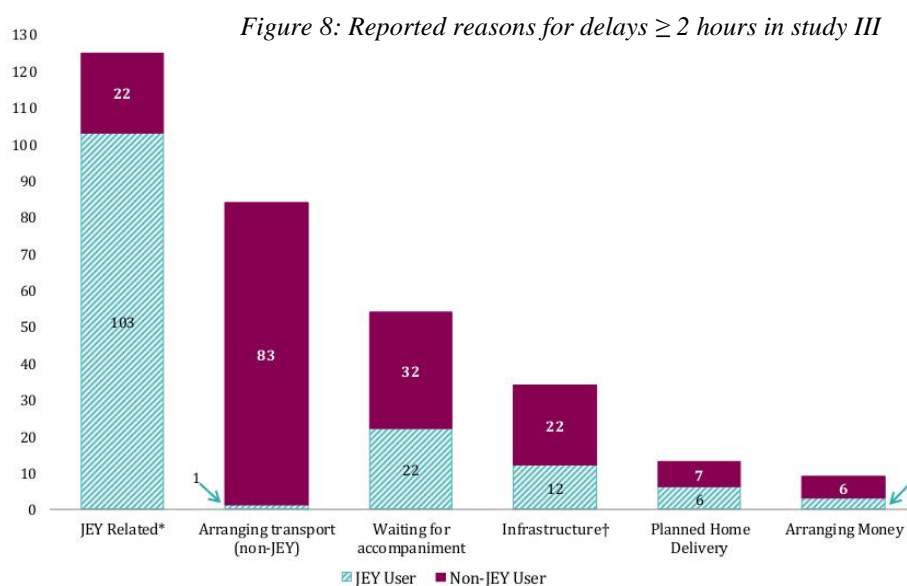
Study III addressed utilization, equity in use and timeliness of the JEY service. Overall the uptake of the service was relatively low (35%), however uptake differed among the districts; 24%, 46% and 52% respectively. As seen in

table 4, JEY uptake was greater in women with lower socio-economic status: women from rural villages were 4.46 times more likely to use JEY (95% CI: 2.38-8.37) compared to urban and scheduled tribe women were 1.60 times more likely (95% CI: 1.18-2.16) than women from a general caste. Nonetheless, almost half of all BPL women (n=237) still paid for alternative

Table 4: Predictors of Janani Express Yojana (JEY) use in Multivariable Poisson regression model n=1005. Column % presented

	Total n	JEY User n (%)	Multivariable Model
	1005	353 (35)	PR (95% CI)
Caste			
Scheduled Caste	246	91 (37)	1.25 (0.93-1.70)
Other Backward Caste	461	148 (32)	1.13 (0.86-1.50)
Scheduled Tribe	139	77 (55)	1.60 (1.18-2.16)*
General	159	37 (23)	1.00
Rural Residence	780	343 (44)	4.46 (2.38-8.37)*
ASHA Accompanied	411	265 (64)	3.07 (2.49-3.78)*

*P-value ≤ 0.05; adjusted by distance to facility and education; PR: prevalence ratio, CI: confidence interval; ASHA: Accredited Social Health Activist



*Delay reported as late/waiting/or non-availability †Poor road conditions/weather (e.g. rain affecting road conditions)

transportation to a facility. The ASHA also played a role in helping women gain access to the free transport. If the ASHA accompanied the woman to the health facility, they were more than 3.07 times more likely (95% CI: 2.49-3.78) to use JEY.

Almost a third (n=303) of the women experienced more than a two-hour delay from deciding to leave their home to arriving at a facility. Transportation delays accounted for 68% of these delays and were more prevalent among JEY users (30%) than non-users (17%). As shown in figure 8, JEY users reported waiting for JEY to arrive (70%) as the most common reason for a transport delay while non-users reported arranging their own transport (48%), lack of an attendant to accompany them to the hospital (18%), poor infrastructure (13%) and waiting for JEY to arrive (13%) as the main the causes of delay.

In the multivariable model, JEY users were not more likely (PR: 1.21; 95%CI: 0.90-1.62) to experience a transport-related delay compared to women who hired a private vehicle to transport them to a facility. However, 30% of all JEY users did experience significant transport-related delays and this was similar to women traveling by public transportation. Rural women (PR 2.90 95% CI 1.63-5.16) and travelling a distance of over 20 kilometers (PR 1.66 95% CI 1.25-2.22) were also more likely to experience a transport-related delay.

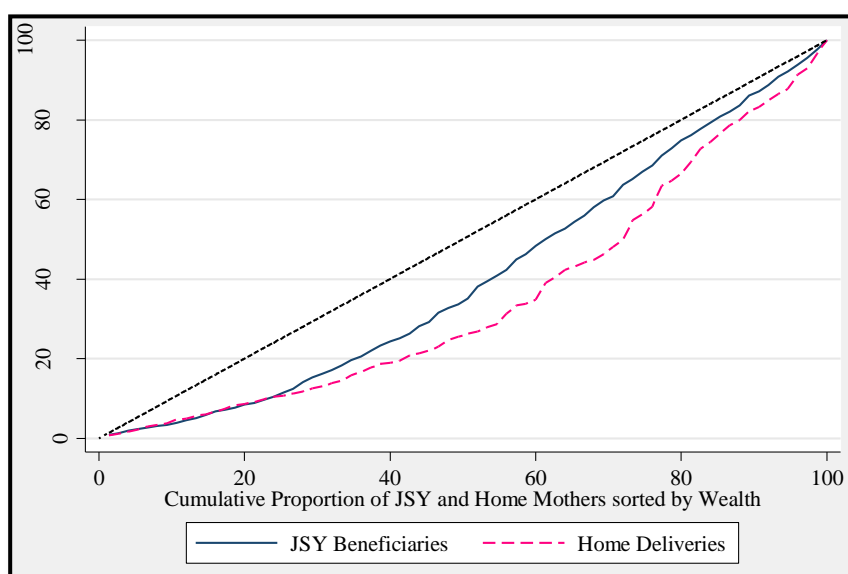
Key results: Role of JEY enabling JSY program participation (Study III)

- Overall uptake was low (35%), but varied between districts
- Uptake was highest among women from rural areas, scheduled tribes, and poorly educated women
- Living in rural areas and belonging to scheduled tribes and ASHA accompaniment were significant predictors
- Almost 1/3 of all JEY users experienced a transport-related delay

Box 4: Summary of key results for role of JEY enabling JSY program participation

5.5 OUT-OF-POCKET EXPENDITURE IN THE CONTEXT OF THE JSY PROGRAM (II & IV)

In study IV, the large majority (91%) of women reported OOPE. Women who delivered under JSY program had a significantly higher median, IQR OOPE (\$8, 3-18) compared to at home (\$6, 2-13). Among JSY beneficiaries, women from the poorest quintile had twice the



net gain (\$20) versus from the wealthiest quintile (\$10) once the cash transfer was taken into account. OOPE was driven largely by indirect costs like informal payments (37%) and food and cloth items for the baby (47%), not direct medical payments (8%). As shown in figure 9,

Figure 9: Concentration curve for women in study IV the concentration curve for OOPE among home and JSY deliveries lies below the line of equality. There was no

significant difference found between the JSY beneficiary (0.189) and home delivery (0.293) concentration indexes. In the multivariable model (table 8), being a JSY beneficiary increased the odds (part 1, AOR: 1.58; 95% CI: 1.11- 2.25) of incurring OOPE. However among only women who had an expense (OOPE>\$0), JSY beneficiaries had a 16% decrease (part 2, 95% CI: 0.73 - 0.96) in OOPE compared to women who delivered at home. Wealth was not associated with having OOPE in model 1. Yet in the 2nd model (OOPE>\$0), increased wealth was positively associated with OOPE.

Table 8: Two part model OOPE (\$) among women who delivered in a JSY facility (n=1,995) and delivered at home (n=386)

Background Characteristics	Part 1 of model: AOR	95% Confidence Interval	Part 2 of Model: IRR	95% Confidence Interval
	n=2381		n=2172	
Place of delivery				
Home	1.00		1.00	
JSY (Public Facility)	1.58	(1.11 - 2.25)*	0.84	(0.73 - 0.96)*
Districts				
District #2	1.00		1.00	
District #1	2.03	(1.30 - 3.18)*	2.36	(2.06 - 2.69)†
Household wealth				
1st quintile (Poorest)	1.00		1.00	
2nd quintile	1.49	(0.98 - 2.27)	1.19	(1.02 - 1.38)*
3rd quintile	1.53	(0.91 - 2.56)	1.33	(1.13 - 1.56)†
4th quintile	1.14	(0.65 - 1.99)	1.31	(1.11 - 1.55)†
5th quintile (Least Poor)	1.21	(0.64 - 2.31)	1.34	(1.02 - 1.49)*
Caste				
Scheduled Caste (SC)	1.00		1.00	
Other backward caste (OBC)	1.15	(0.76 - 1.73)	1.14	(1.01 - 1.28)*
Scheduled Tribe (ST)	0.97	(0.62 - 1.52)	0.7	(0.60 - 0.81)†
General	1.19	(0.63 - 2.22)	1.07	(0.91 - 1.26)
Birth order				
1st child	1.00		1.00	
2nd child	1.21	(0.82 - 1.79)	0.82	(0.73 - 0.92)*
3rd child	1.03	(0.63 - 1.68)	0.71	(0.60 - 0.83)†
4th or more child	0.64	(0.35 - 1.17)	0.69	(0.56 - 0.86)*

Adjusted for age, education and delivery type; AOR: Adjusted Odds Ratio; IRR: Incidence Rate Ratio; *p-value ≤0.05; †p-value ≤0.001

Many of the JSY beneficiaries described difficulties in obtaining the cash incentive, including procedural hurdles of opening a bank account to deposit the check and being instructed to come back to the health facility at a later time to receive it. One mother expressed her opinion on the current procedure to receive the money like this:

"It is both good and bad...It is good to get money through the bank because only then it [the cash] is given to the mother. When we used to get cash, anyone used to go and get the money saying the mother can't come and receive the money. We have problems in this new process but at least the mother gets the money... When we used to get the benefit in cash, we got it within 15 minutes. We could use this money for the mother and other delivery-related expenses. Now, we have to wait for 2-3 months and the money is not used for delivery expenses." – JSY Beneficiary, Age 25

They also recounted trouble retaining the entire benefit due to paying ‘rewards’ (informal payments) to hospital staff and the ASHA, buying medicines, fees to open the bank account and transportation-related expenses. The women knew they were not supposed to pay the hospital staff but felt powerless to do otherwise. One JSY participant expressed her rationale for paying like this:

“They will fight and take money from you. We need them at this time otherwise they will not even touch you for delivery. If they will not attend to us in severe pain, what can we do? We are left with no choice but to pay them whatever they ask. We didn’t think we should [pay the hospital staff money]. But when they demand it, we have to pay them. I had severe pain and the nurse was adamant that first I should give money and only then she would treat me. What can we do? It was the only way to get help.” –Age 35

Some women conveyed conflicting emotions when talking about the costs associated with a facility-based delivery and receiving the benefit. They questioned the appropriateness of having to pay for some delivery services, but also felt the program provided cash to pay for these elements thus avoiding additional OOPE and accruing debt.

Yet, when asked how these negative experiences would affect their decision to participate in the program in the future, all but one JSY beneficiary replied it would not have an impact on whether they would have a facility-based delivery.

Key results: OOPE in the context of the JSY Program (Studies II & IV)

- Among the JSY beneficiaries, the poorest women had the largest net gain when the cash transfer was taken into account.
- OOPE was largely due to indirect costs like informal payments, food and cloth items for the baby and not direct medical payments.
- OOPE under the program were progressive with the most disadvantaged wealth quintile making proportionally less OOPE compared to wealthier women.
- Being a JSY beneficiary increased odds of incurring OOPE. However among only women who had an expense (OOPE>\$0), JSY beneficiaries had a 16% decrease OOPE compared to women who delivered at home.
- Many women reported procedural difficulties to receive the benefit. Retaining the cash incentive was also an issue due to OOPE incurred at the facility.

Box 5: Summary of key results for OOPE in the context of the JSY Program

6 DISCUSSION

6.1 DISCUSSION OF THE FINDINGS

Over the last decade, numerous health interventions have included a component to address financial access barriers, such as the cash incentive in the JSY program. The JSY intervention design is based on the classic economic assumption that people's behavior is rational. Specifically, that it can be influenced by introducing financial incentives. While there is limited evidence on exactly which feature of the CCT program matters most,¹⁰⁸ results from quantitative evaluations that show a significant relationship between increased institutional delivery and the JSY program indicate a degree of justification for this assumption. The cash incentive has been successful in changing women's behavior to seek institutional delivery.^{53,54,109} However it is important to keep in mind that there are multiple drivers influencing participation in a program like the JSY, as the program (a) has a number of supporting elements (ASHA, cash incentive, transportation support), and (b) the program does not occur in a vacuum but in a context with dynamic social norms around childbirth.

6.1.1 Socio-cultural factors and perceived need, benefit and cost influencing program participation

Who participates in the cash incentive program (JSY) to promote institutional delivery and reduce maternal mortality?

When study I was conceptualized in 2010, there was only one previous study that had been published by Lim et al. assessing JSY uptake and characteristics of program users.⁵³ While this study was a large one, it was based on secondary data from the DLHS surveys that had been done largely prior to the JSY. Further, it did not look specifically at predictors of non-participation (i.e. private facility or home deliveries). There is ample evidence that higher maternal age, education, household wealth, lower parity, ANC use and distance to a health facility are predictors for facility-based deliveries.⁸⁰ I also found similar characteristics to be predictors of program participation. Study I was the first study on predictors for program use that differentiated between private facility and home deliveries, which was important as the women from those two groups had extremely different background characteristics. While two different Indian studies performed in urban slums found similar predictors, it was not surprising to find they reported different reasons for non-participation (home deliveries) as access barriers and reasons are very different from the rural and urban poor.^{73,74}

In study I, the JSY beneficiaries shared many socio-demographic characteristics (i.e. age, poverty level and caste) with women who delivered at home. However, they did differ in many important regards including education, parity, ANC utilization and awareness of the JSY program. The socio-demographic profile among women who gave birth at home or in a private facility was significantly different except for the lack of JSY program knowledge. Some argue women delivering in the private sector are not a priority target for the JSY program as they belonged to better socio-economic groups that could afford the high out-of-pocket payments that are prevalent in the private sector and do not need an additional incentive to deliver in a health facility. We did not include questions in study I that would allow us to construct a wealth index (only information on BPL status), therefore we could not

test this assumption. However, we were able to calculate a wealth index for the women from study IV and found 82% of the women who delivered in a private facility belonged to the two richest wealth quintiles providing some evidence to justify this assumption.

One criticism of CCTs in general, and specifically for JSY, is that often the CCT does not reach the most vulnerable populations.^{44,110–112} While all women in Madhya Pradesh are eligible for the program since NRHM classified it as a ‘low-performing’ state, we found women from the most marginalized sub-populations (poor and disadvantaged castes) were more likely to participate in the program. However, we also found that there was a portion of poor women from the same sub-population who continued to give birth at home. So in this context, I would argue the JSY program has reached some of its target population, but certainly not all.

Why do women participate (or not) in the JSY program?

There is extensive research demonstrating CCTs increase utilization to the desired service⁴⁴ which is also applicable to the JSY program. However very few studies focus on *why* the programs are successful and even fewer explore the role the monetary incentive plays in this modified behavior. Adato et al., one of the few research teams who have tried to study the impact of the actual incentive on behavior, argue that the impact of a cash incentive is more limited than originally assumed by CCT programs. However, it does have the potential to initiate changes in behavior.¹¹³ They also contend that socio-cultural drivers (such as gender and social norms, roles and relations) strongly affect the way people respond to a program like JSY and are equally important to consider when trying to understand why people participate in a specific program. The findings from study II underpin this argument. We found several factors influencing women’s participation in the program including a shift in social norms, individual perceptions of safe and easy delivery, the ASHA, and finally the actual cash incentive. To fully comprehend how the JSY program has influenced women’s behavior, it must be approached with a multi-lens perspective.

Role of the cash incentive

For some women in study II, the cash incentive was their main motivator for choosing a facility-based delivery while for others it was clearly influenced by other factors and, at best, complemented by the cash incentive. One possible explanation for this diversity in responses comes from a randomized control study on incentives to assist in smoking cessation. This study found that although the cash incentive intervention group was significantly more likely to quit smoking, participants denied the incentive played a role. Volpp et al. described the tendency people have of attributing behavioral change to their own motivations versus a monetary incentive.¹¹⁴ We also found in our study that JSY beneficiaries were less likely to attribute the JSY program to their seeking an institutional delivery, while the women who gave birth at home explicitly stated it was a main motivator. It is important to mitigate the social desirability response, however it may be extremely difficult to address if the participant is not even conscious of the underlying reasons for a particular response. This complexity behind modifying health-seeking behavior most likely explains the range in views towards the cash incentive.

Role of the ASHA

ASHAs are selected from their own community to serve that very same community. These women are incentivized for certain tasks related to promoting healthy behaviors, but do not receive a salary from the government. Our studies have shown an evolution in the role of the ASHA. While in study I we speculate on how influential the ASHA's role is in JSY uptake, by study II and III, we see her role has grown exponentially. Also by this time, one study had found that external pressure by the ASHA contributed to the increase in JSY participation.¹¹⁵ The ASHA cadre had grown not only in size, but also in power and prestige within the village. The women from study II described a scenario where the ASHA was acting as an 'agent of change' by promoting the need for institutional delivery on behalf of the community and the government. Due to their position of relative authority as a quasi-government agent, they were able to exert considerable influence on the women. Though most in our study reported a positive interaction with the ASHA, some expressed concern or fear of retribution for an unintentional home childbirth.

So while the role of the ASHA is an important component of the high participation rate, some have argued their role in the JSY program exerts strong/potentially coercive pressure on women's behavior rather than sufficiently recognizing and supporting women's agency and rights.^{116,117} ASHAs cite their financial incentive (600 INR, \$10) for accompanying women to the health facility as their main motivation.^{118,119} Therefore the social pressure they exert on the women is probably motivated by the outcome-based incentives they receive.^{117,120} An outcome-based system provides additional incentives for ASHAs to work towards the program goal of increasing institutional delivery. It also creates silos that are counterproductive to the broader goal of improving sexual and reproductive health and rights for women.¹²¹ Outcome-based remuneration systems often exert harmful pressure on the most vulnerable groups to ensure their goal is met. Reports have suggested integrating the ASHA into the public health sector as a full-time salary worker thus eliminating the incentive to force women to deliver under the program.^{117,122} A few Indian states have introduced a fixed monthly stipend instead of the outcome-based payments for the ASHAs.⁶⁰

Perceptions of 'safe' delivery care and quality of care

Actual and perceived quality of care could be an important factor influencing where some women deliver. Studies have found women prefer to deliver in a private facility when confronted with a poorly functioning public health sector.^{123,124} Further, another Indian study found underutilization of government delivery services was due to perceived poor quality of care in public facilities.¹²⁵ Some of the explanations for non-participation from the women in study II support both of those findings. However, we also found that women express a strong desire for a 'safe' and 'easy' childbirth. Most could not articulate what constituted quality care, yet felt it would be provided if they delivered in a health facility.

This thesis did not evaluate the clinical quality of care received by the women; this is a separate issue and beyond the scope of this thesis. Nevertheless, the assumption is if a woman delivers in a health facility she will receive the necessary care regardless of whether it is a routine or complicated birth. From study III, we know the women who utilized the JEY were more likely to deliver in a facility that did not provide EmOC, nearly all of these residing in the public sector. Further, there have been several reports questioning the quality of care administered in the government-operated facilities¹²⁶⁻¹²⁹, where the majority of women in this

thesis and in Madhya Pradesh avail birth services. JSY participation will not be maximized and more importantly maternal mortality will not fall until these assumptions are a reality.

Our studies give some indication that the size of the incentive overrides the quality of care given in the health facilities, implying that the monetary value of the cash is extremely important to these poor rural women. While there is no argument that high-quality care is pivotal to reducing maternal mortality, how influential it is on women's participation is uncertain.

6.1.2 Physical accessibility

Issues of gaining access to childbirth services are well known and documented for low- and middle-income countries (LMIC) with high MMR including cost of transport, challenging diverse geographical terrain, poor communication process, and suboptimal distribution and location of health facilities.^{81,130} In addition to operating in the context of poor infrastructure, arrangements for emergency transport have often been informal and 'ad-hoc' in the absence of reliable emergency transportation facilities provided by the state in LMICs. Ensuring the availability of emergency transport for EmOC is challenging in general, but is exacerbated for rural areas given that the road infrastructure is normally in a state of disrepair, seasonally functional and poorly maintained and there is limited availability of a reliable public transport system.¹³¹ The World Bank estimates that 75% of maternal deaths could be prevented through timely access to care facilitated by transport.¹³²

A systematic review of maternal health initiatives suggested the most effective interventions included the implementation of a functional transport referral program.¹³³ Various innovative interventions through-out LMICs, differing in scope and design, have emerged to do just this.¹³⁴ In Sierra Leone, the government combined the use of four-wheel drive vehicles and a radio communication system to increase transfers of obstetric cases from peripheral areas to the hospital.¹³⁵ Motorcycle ambulances were used in rural Malawi to help improve access to care.¹³⁶ Community groups in India and Nepal established emergency transport funds to assist women seeking institutional deliveries.^{137,138} Non-governmental research teams in Nigeria established agreements with the Union of Commercial Private Road Transport Workers to provide emergency transportation for a reasonable fee.¹³⁹ The current literature highlights JEY as one of the first public private partnerships for emergency transport.

Do women face physical access barriers to participate in the JSY program?

It was not surprising to find that the women in study I cited transportation as a major barrier considering JEY was in its infancy and had recently been rolled-out state wide (2009). While the cash transfer had been implemented in 2006 and some of the financial access barriers addressed, geographical and transport-related barriers persisted. When we performed the in-depth interviews (study II), lack of transportation as a reason for home deliveries was explored. Initially, I was surprised to find that, among these women, it was not portrayed as a fundamental barrier to program participation but more of a one off issue. However upon further reflection, this made logical sense because by 2013, JEY was fully implemented in these districts. It is plausible to assume some of the women who would have previously given birth at home were able to utilize the free emergency transport service. The reasons for home deliveries in study IV corroborated this assumption and showed that the main reason for

home births had shifted accordingly. So while there are probably some women who still experience physical access barriers, neither the qualitative study (II) nor the second population-based study (IV) found transportation as the main rationale for non-participation. Both these studies were done after the JEY was established across the state.

In a study using DLHS data, Kumar et al. found distance to a health facility was a significant barrier to institutional delivery in India: for every one-kilometer increase in distance to a health facility, women were 4% less likely to have an institutional delivery.¹⁴⁰ They suggested that in order to raise institutional deliveries, additional facilities should be built so that the maximum distance to a health facility was restricted to five-kilometers. Based on evidence from study IV regarding the reasons for home deliveries in conjunction with the knowledge that JEY traveled a median of 11.3 km; I do not believe building more facilities would be the most effective use of the government's limited resources. There is a need to understand the cost-effectiveness of a program like JEY, but assuming it is cost-effective, expanding the JEY model to increase capacity would probably be a better investment.

Who and how many use the free emergency transport model (JEY)?

Babinard et al.¹⁴¹ reiterates the important role transport plays in facilitating efficient and effective care by enabling access, especially for rural areas. For women who live in urban areas with an established functioning health care infrastructure, geographical distance may play a small role in determining access to care and subsequent health outcomes. However, in rural areas where provision of care is more difficult to find, weak road infrastructures, with predominantly poor women, geography can present a fundamental barrier to accessing adequate care thus perpetuating high maternal mortality.^{81,82,142} The findings from study III showed that JEY is minimizing not only the geographical barrier among poor, illiterate, rural women, but also the financial access barrier as it provides this service for free.

The highest uptake took place among the more rural districts (Shahdol and Panna); nevertheless overall uptake to the service was low. Ujjain had the lowest uptake of JEY, however a large proportion of its mothers were residing close to a facility in an urban area. Considering these women have several other transport alternatives, they are not the primary target population for JEY. This district also had the highest number of deliveries in the private sector. Although the JEY guidelines do not explicitly prohibit a driver from transporting a woman to a private facility: it was uncommon in our study for a JEY user to deliver in a private facility.

More than half of the women in the study had to pay for their transport, the majority of them living below the poverty line, only 13% had immediate access to their own transportation. There is an opportunity for the JEY to expand its services to more women in need, especially among the women living in rural areas where free transportation alternatives are not readily available. While we can only speculate as to why these women did not use JEY, it is possible there are too few vehicles in service with the result that when women needed it, the service was unavailable.

Is using JEY associated with delayed access to a health facility?

Almost a third of all JEY users experienced transport related delays. While JEY users were not more likely than hired vehicles to experience a delay, nonetheless a significant portion did experience one. These delays were likely due to a combination of long waiting times, poor road conditions, and a possible capacity issue in relation to the demand for the service. Strong monitoring mechanisms by the state are required to ensure a high quality service and that ultimately women reach the health facility in a timely manner.

6.1.3 Economic accessibility

There have been few studies assessing the out-of-pocket expenditure (OOPE) experienced during childbirth and even fewer under the JSY program. The previous studies have used secondary data that did not allow for cost disaggregation and assessed a time period when JSY coverage and overall institutional delivery were low or small in size.^{65–69,79} In addition, for some the costs were collected for deliveries that occurred in the previous five years, suggesting the opportunity for substantial recall bias. Considering how quickly JSY participation has increased in such a short period of time, it is important to have recent data that reflects the current situation.

How prevalent and how much is out-of-pocket expenditure among women who participate in the JSY program or who deliver at home?

High OOPE is a well-known constraint to the utilization of childbirth services where quick access to cash is not available for many poor households.¹⁴³ While all delivery services should be free in the public sector, this is rarely the case. In fact, many studies report OOPE in the Indian public sector.^{65–69} Our study is no exception, the large majority of JSY beneficiaries and women who delivered at home reported OOPE. The patterns of spending were similar in both groups. For example wealthier women and women living in Ujjain district tended to spend more, while women from scheduled tribe and multiparous spent less.

Direct healthcare costs (i.e. operations, medicines, supplies) are supposed to be paid for by the government. In our study, direct costs constituted the smallest proportion and absolute sum in the OOPE. On the other hand, indirect costs (i.e. informal payments and food and baby items) were the most common source of OOPE. Thus it is not the technical medical care driving the OOPE, but informal costs. The high proportion of informal payments to staff most likely explains the wealth gradient in OOPE. In other words, women who have more money, spend more money. The women in study II expressed they did not want to pay the facility staff, however felt compelled to do so in order to receive treatment. The necessity of informal payments acknowledged by the very women making the payments is a difficult problem to address. Better governance of the JSY program in the facilities will not reduce OOPE driven by ‘rewards’. Women must feel that withholding payment will not result in lack of care.

Although the Indian government clearly states the JSY program is an *incentive* to encourage women to have a facility-based delivery and *not* to cover OOPE, many women from study II reported the intention to use the cash to compensate for the OOPE incurred. Only 25% of the women who delivered in a JSY public facility in study IV received the cash incentive upon discharge. While study I found 85% of the women received the benefit within two weeks of

delivery, if the cash benefit is expected by the women to cover their OOPE, it needs to be received upon discharge.

Does OOPE differ from women who delivered at home?

Many studies cite the gap in knowledge regarding how much OOPE was incurred by JSY beneficiaries, but few compare it to home deliveries.^{66,144} In the crude analysis, it appeared JSY beneficiaries incurred higher OOPE than women who delivered at home. However once we took possible confounders into consideration, JSY beneficiaries paid more often, but they paid less each time. This was contradictory to previous Indian studies, but not surprising as they often did not control for potential confounders or it was performed on secondary data and deliveries that occurred over the past five years.^{65,67} One small study found there was no difference in OOPE between home and JSY deliveries.⁶⁸

Does JSY reduce financial access barriers and to what extent?

Research has shown that a significant proportion of women report cost as the major barrier to having a facility-based childbirth.^{63,70,79,145,146} However, study IV found JSY beneficiaries had lower OOPE compared to women who gave birth at home. In addition, the cash incentive managed to cover almost all JSY beneficiaries' OOPE. They received a net gain, especially among the poorest quintiles, after receiving the cash. The JSY beneficiaries in study II also supported this and reported that the incentive was generally large enough to cover the OOPE. Most had a small sum remaining after paying for the expenses incurred. However again to reiterate, context is very important. It has been reported in other parts of India that the JSY program was not adequate enough to cover OOPE but only able to provide some financial protection.^{66,144}

Lastly, the women in study II and IV who delivered at home did not cite financial barriers as justification for a home delivery. This implies that other access barriers persist, some of which may be remedied but not necessarily by a cash transfer program.

How fair is the CCT?

In general, health-care financing systems that are progressive tend to have a redistributive nature. Some examples are when wealthier households have a higher tax rate compared to poorer ones and social service provision by the government that offers free delivery care.¹⁴⁷ So while vulnerable groups often have more healthcare needs, despite contributing less, they are able to obtain the same service as their wealthier counterparts.

Our concentration curves showed that the OOPE for women who delivered under the JSY program was pro-poor: poorer households had proportionally less OOPE during childbirth compared to wealthier households (i.e. a progressive fee system). From a strict equality perspective, the distribution was not equal. The same logic can be applied to progressive fees (like OOPE). Just as many view progressive taxes and social services to be fair, progressive fees can be considered fair since wealthier households have the means to pay for services while poorer ones do not.¹⁴⁷

However, as we see in study I, the women who deliver in private facilities tend to be wealthier and from the general caste. While we did not collect costs in the first study, it is

well known from other publications and data that I have collected that women pay a significantly higher amount of OOPE in private health facilities.^{65,67-69} There is a common perception that quality of care is significantly higher in private facilities.^{125,148} So is it fair that wealthy women can afford higher-quality care than poor women? The fact that vulnerable women are more likely to be JSY beneficiaries possibly reflects that poor women choose (are forced to choose?) a lower standard. So a cash transfer program increases the proportion giving birth in a health facility, but it does not necessarily make access to quality of care more equal. On the other hand, if the families chose to use the cash transfer for another purpose (i.e. on more nutritious food) rather than to subsidize the delivery, its contribution could have a longer effect on the entire household than the somewhat subjective higher quality of care would have.

6.2 METHODOLOGICAL CONSIDERATIONS

Quantitative and qualitative methods exist along a continuum of measurement. Each type of method has its respective strengths and limitations. Both types were employed in this thesis to minimize the limitations in a particular method and maximize its strengths.

As with all research, there are important methodological considerations that should be acknowledged and discussed. I would like to highlight some of these considerations (both strengths and limitations) regarding the data collection, study design, sampling and analysis.

Some important questions every researcher should reflect upon are: are the observed associations in my data valid? Are there alternative explanations for the association found? There are generally three explanations for an association; (i) the association is valid, (ii) it was a random error (chance), or (iii) it was caused by a systematic error (bias). Bias has been defined as “any systematic error in the design, conduct or analysis of a study that results in a mistaken estimate of an exposure’s effect on the risk of disease”. Gordis recommends the acknowledgement of possible bias sources that could affect the internal and external validity of a study.¹⁴⁹

6.2.1 Internal validity in Studies I, III & IV

Internal validity (i.e. ‘truth value’) is the ability to measure what the study aims to measure i.e. whether the study was performed well.¹⁵⁰ Bias can occur throughout different phases of research (i.e. study design, data collection, or during data analysis). Selection bias occurs during the study design phase. Exclusion bias, information/misclassification bias, and recall bias occur during data collection and confounding occurs during the data analysis phase. In the following sections, I will discuss different biases and the potential implication in regards to studies I, III and IV.

Selection bias

Selection bias occurs when there is a systematic error in how the study participants were selected. This selection can have a significant impact on the internal validity of the study and conclusion by producing erroneous odds ratios or relative risks and non-valid associations. We had an extremely low response rate in study I, only 54% of the women who delivered in 2009 within our selected villages were recruited. This could have yielded a selection bias and had several implications for the interpretation of the study results. However, since the study

was performed in a DSS, I had background characteristics for all 349 of the non-responders. I compared the characteristics between the non-responders and our study sample. In the Pearson's Chi-squared analysis, I did not detect any significant differences between the two groups. So while the non-response rate was high, selection bias was probably not a major bias as our non-responders had very similar characteristics to the study population. The response rate was quite high in study III (98%) and study IV (94%), thus selection bias through a non-response was not considered an issue.

Study III was based on facilities that performed more than ten deliveries in a month. This study design was appropriate to answer the research questions (e.g. Who and how many use the free emergency transport model JEY? and Is using JEY associated with delayed access to a health facility?) However, it does not allow us to assess the JEY need in the population. Nevertheless, the rationale for home births in study IV gives evidence this need may be small. Lastly, while the study facilities were a sub-set of all facilities in the district conducting deliveries, since they represented 97% (n=14,923) of all facility-based births for our study districts in 2011, this was not deemed a limitation.

Information/Misclassification bias

Information bias can occur when the selected methodology is inadequate to collect data on either exposures or the outcomes. It was possible that we misclassified (misclassification bias) a study participant's response (exposure or outcome) but if this occurred, it was as a non-differential misclassification bias (the misclassification error was equal throughout the entire study sample).

This was of particular concern when we collected reasons on why women had home deliveries in studies I and IV and reasons for more than a two-hour delay getting to the health facility in study III. Eliciting qualitative answers with a quantitative tool can be difficult. Thus to compare the reasons why women gave birth at home from studies I and IV, the questions had to be asked and responses recorded the same way. SOPs are one strategy to minimize information bias during the data-collection phase.¹⁵¹ These standardized protocols ensure the data is collected consistently and help minimize inter-observer variability. The research assistants were trained on how to ask the question in a consistent manner, and subsequently how to classify the response. In study I, there was only one data collector and myself so this was not a major area of concern. However in studies III and IV, large teams of research assistants were used to collect data. SOPs were developed long before data collection began, and used as a resource in the field when research assistants had difficulties with a particular question. While I believe misclassification was minimized, consequences of a non-differential misclassification could nevertheless cause dilution of the effect (odds ratio or prevalence ratio) and one is less likely to find an association if it truly exists (i.e. JEY role in delayed access to a health facility).

Recall bias

Recall bias, another type of information bias, is a systematic error caused by inaccuracy or incompleteness of study participants' recollections. This bias was not a main concern for study I because the types of exposures and outcomes collected in this study were relatively stable (age, education, caste, place of delivery, etc.) and not typically reliant on someone's ability to recall a specific detail.

However in study III we collected maternal reports of time (when she decided to leave for the health facility and when she arrived) in order to construct the delay variable (\geq two hours to reach a facility). This variable could be affected by the mother's ability to accurately recall the time and events preceding the delivery. Recall bias was minimized by administering the questionnaire shortly after delivery and the mother's response was triangulated with other family members present during the interview.

The outcome variable for study IV was out-of-pocket expenditure (OOPE) and it has been demonstrated that data collection methodology and the recall period both influence the reporting of OOPE and contribute to significant variation in OOPE estimates between participants and in comparison with other studies. Lu et al. found fewer line items (less disaggregation among cost categories) lowered the reported estimate of OOPE, while a shorter recall period produced a larger estimate.¹⁵² Considering our study was performed within a week of the event and that we used a disaggregated data collection tool, we feel confident in the validity of our findings.

There is a possibility that women from wealthier households recalled OOPE differently than women from poorer households. It is not unreasonable to assume people from diverse socio-economic backgrounds perceive the value of money differently. In other words, there may be a systematic difference in the way a poor woman would recall an expense (big or small) compared to a wealthier woman.

Regression Models and Confounding

Since the prevalence of the dependent variable in study III was relatively common (above 10%) for both models (35% were JEY users and 31% experienced more than a two hour delay), we felt a logistic regression with odds ratios would overestimate the point estimates. Barros et al. argue that Poisson regression with robust variance for cross-sectional data is a superior alternative to logistic regression since prevalence ratios are more intuitive to the naive reader compared to odds ratio.¹⁵³

A two-part model was used in study IV. It was originally developed as part of the Rand Health Insurance Experiment. It proved to be a superior model compared to selectivity models especially when the data contains excess zeros and the assumption of normality of the error term is not satisfied, which occurs often in health expenditure data.^{154–158}

Confounding, one of the most important problems in observational epidemiologic studies, can be defined as when factor X (confounder) is a known risk factor for disease B (outcome) AND the same factor X is associated with factor A (exposure) but is not a result of factor A.¹⁴⁹ In addition to using one of the standard methods for selecting a confounder (p -value ≤ 0.10 for the exposure and outcome variable), casual diagrams were also used to help identify potential confounders, such as in study III when studying the involvement of the ASHA in JEY uptake.¹⁵⁹ The diagrams were especially helpful in identifying variables that should be tested for interaction and helped us avoid controlling for variables that were not actual confounders. Nevertheless, it is important to point out that while we can control for observable characteristics in regression models, we cannot control for unobserved characteristics so the possibility of biased coefficient estimates still remains.

Endogeneity, when the independent variable has an association with the error term in the regression model, also arises from uncontrolled confounding variables. This could lead to a biased coefficient in a linear model (such as the model used in study IV).¹⁵⁸ The two-part model is a commonly used to address this issue.

6.2.2 External validity in Studies I, III & IV

External validity refers to the ability of the study to generalize its findings to other groups or settings. It is important to understand the type of sampling plan that was used and whether the sample was representative. However, before I discuss the individual studies, I would like to highlight once again the heterogeneity of my setting. Madhya Pradesh is made up of 51 districts and they are all different to a certain extent with regard to population sub structure, terrain, level of urbanization, literacy, healthcare infrastructure etc. Since this thesis comprises three different districts, external validity needs to be considered with care.

I viewed the study design (population-based) and sampling plan (stratified random sampling) as a strength for study I and the best method to address the research questions. The stratified random sampling plan was appropriate as all of the villages in the DSS were approximately the same size, meaning the women in the villages had the same probability of being selected. We felt this yielded a representative sample for the DSS. However, program uptake in Ujjain district was quite high especially compared to other districts like Dindori (a non-study district) which had the lowest program uptake (18%) in Madhya Pradesh. While the place of delivery proportions were similar in study IV (77% (n=1,995) of women were JSY beneficiaries) compared to study I, caution should be exercised when generalizing outside of Ujjain district.

In comparison to study I, studies III and IV were a much larger undertaking. Study III was a facility-based survey which was an appropriate design for the research question (i.e. who was using JEY and was it delaying access to the health facility). It was not possible to explore this in study I because JEY had not been implemented across all blocks in the district. It nevertheless limits our ability to assess the transportation need in the general population. However, it is important to reiterate that the number of women citing a geographical access barrier as the reason for a home delivery birth substantially decreased between studies I and IV.

I consider the study design and sample size for study IV to be robust and have good internal and external validity. Random error results from sampling variability decreases as the sample size increases. We decided on a different sampling strategy for the population-based study IV because there was significant variation in the size of villages between the two districts and within the blocks. Further we did not have a household/population list as we did in study I, therefore probability proportion to size (PPS) sampling was deemed a more efficient design.¹⁶⁰ PPS ensures all individuals in the study population have the same probability of being selected irrespective of the size of their cluster (i.e. village). This was especially important because the more urban villages tended to be closer to facilities and larger in size. The rationale behind using a multi-stage technique was that we assumed women who lived closer to facilities experienced different access barriers and costs than women who lived further away. This method also facilitated the planning and arranging of logistical field work since the number of individuals that were to be recruited in each village was pre-determined.

While the elimination of the extreme villages was not necessary due to the design of PPS, we felt it was necessary to maximize time and financial resources.

In summary, we have tried to address the different biases by taking the appropriate precautions during the study design, data collection and analysis phases. These steps have increased the internal and external validity of the studies. However, as we alluded to above, because of India's heterogeneity and the importance of context in this setting, we would be cautious in trying to generalize our findings from any of the studies. In my opinion, the results are representative of our study population, however due to differences found between the study districts, we would hesitate to generalize our findings beyond the districts to the state, much less the country.

6.2.3 Trustworthiness in Study II

The term qualitative research is used to describe a wide category of diverse approaches and methods found within different disciplines. While there is no agreed-upon definition of qualitative research, most do agree that a common perspective is shared; "realities are a result of the individual and are subjective, manifold and socially constructed".¹⁶¹ Lincoln and Guba (1985) posit a set of guidelines to ensure that the same level of validity is achieved and similar rigor is applied in qualitative research as in quantitative research. I have chosen the same criteria (credibility, transferability, dependability, and confirmability)¹⁶² to evaluate my qualitative study (II), and these criteria are described below.

Credibility answers the question: have we measured what we intended to measure? There should be confidence in the 'truth' of the findings although it is essential to remember truth is relative and many truths exist side by side. In order to increase credibility, it is recommended to spend prolonged amounts of time in the setting where the data is collected. This allows for the researcher to gain a better understanding of the general context in which the data should be viewed.

By the time I started data collection for the qualitative study in 2013, I had spent a total of nine months in India. All of the time was not necessarily spent in the same living conditions as my study population, however in a way where I could experience and interact with the environment daily. I believe this time spent in India was important to help me understand the context in which the study communities lived and how this shaped the women's answers to my probing questions. Without this insight into their context, I think it would have proved very difficult to insightfully interpret the data.

An obvious language barrier existed between the study participants and myself since the interviews were conducted in Hindi, which I neither speak nor understand. None of the participants spoke English, so while I facilitated the interviews (asked the questions), I was solely dependent on my translators to ensure they asked the appropriate question and subsequently translated the answer back to me. This was a challenge; however I spent a month in the field interviewing these women often in rural villages that took several hours to reach. Therefore I had a significant amount of time to discuss the interviews, my objectives, and perceptions of what I saw and heard with my translators. We had the opportunity to extensively debrief immediately after each interview. In the first district, the translator was a young woman with a background in social science. She was enthusiastic and eager to do a

good job, however she also encountered some language barriers as the Hindi dialect spoken in this part of MP was different from her own. This issue improved in the second district, where the translator was a more mature woman with a sociology background who had extensive field experience and spoke the local dialect perfectly (as she came from that district).

Before we started the data collection, I reflected on how my presence might disturb the interview flow and affect the quality of the data. Would the women feel uncomfortable in the presence of a foreigner? Would the translation process be too cumbersome to have a productive and fruitful dialogue? In discussion with my supervisors, we decided to see how my presence would affect the women during the pilot testing of the interview guide and make a decision going forward. I felt my presence and the lapses that ensued due to the translation process did not have a huge impact on the quality of the interviews. On the contrary, my position as a foreigner allowed us to ask questions or clarifications on topics that normally women would shrug off as common knowledge. For example, I could take advantage of not being from the area to ask the women to expand when they said “well you know how it is” or gave a shrug of the shoulder to a question. It was acceptable to ask what the shrug meant. Almost every time, they would happily give further explanation which in the end yielded richer data. Although I was not able to directly understand what the women were saying, I was able to observe all the non-verbal noises, gestures, and facial expressions that at times were just as informative as the actual words.

The risk of a social desirability bias is always present when conducting research, qualitative or quantitative, but especially when researching a topic concerning shifting social norms. We need to consider the possibility that the unintentionality expressed by women who delivered at home may be a response to some social desirability bias. To minimize this bias, I tried to portray a non-judgmental position throughout the interview; not reacting to controversial opinions or reflecting judgment in any way. There is also a possibility that the women associated me with the health system, limiting how far they were prepared to express deviations from a pro-health service norm.

We were aware of the young women’s relatively low status position in the household and how the presence of others could deter them from expressing their true thoughts or opinion. I would also like to acknowledge the concept of ‘mutedness’ and how this may have been an issue as well. It is the concept that the least powerful tend to internalize norms supported by the more powerful i.e. young women’s subjectivity may be such that they find it difficult to perceive, let alone express their own needs and opinions.¹⁶³ Whenever possible, we asked the older household members to leave the interview room. Participants were encouraged to speak openly and freely and it was emphasized several times that there was no right or wrong answers. This was also one of the main reasons we felt individual in-depth interviews were a better alternative to focus group discussions.

Transferability answers the question how applicable are my findings in other contexts? Since individual meaning and perspective are central to qualitative methods, the findings are not viewed as absolute facts applicable to the wider population. Instead, they are viewed as an analytical description applied within a certain setting and context to enhance our understanding of a specific phenomenon.^{164,165} One of the most important components to

evaluate transferability is the provision of thick descriptions of the local context. This allows the reader to judge whether the results might be applicable to their own setting. I have tried to provide this in the methods of study II. Local context is extremely important when interpreting these results and transferring it to other populations. For example there are other places in the world and even within India where women still prefer to give birth at home. We have evidence from another study in the larger MATIND project from the state of Gujarat where many women still prefer to deliver at home. Thus just as I urged caution with the generalizability of the findings from the quantitative studies, this also applies to the transferability of study II.

Dependability answers the question, how consistent are my findings and is our research possible to repeat? Transparency with regard to the analytical process going from the interviewees own words to an explanatory account is used to increase dependability. We achieved it through two mechanisms; the framework analysis approach and triangulation.

The majority of my previous research experience was in quantitative studies, so I was completely new to the qualitative field of research. I had the good fortune to work with extremely talented and experienced qualitative researchers on this study. We used the Ritchie and Lewis' framework analysis approach to data management and analysis.¹⁰⁰ As I mentioned in the methodology section, this is a matrix-based approach that provides a structured method to manage the data while maintaining the flexibility needed during the explanatory interpretation phase. I feel this method of data analysis contributed greatly to the dependability of our findings.

Triangulation is employing multiple methods, like quantitative and qualitative approaches, to study a single problem. Triangulation can also include data triangulation (using several sources of data in the same study) or researcher triangulation. This thesis uses a combination of triangulation methods. First it triangulates different methods to answer the research questions. Secondly, data triangulation was used during the coding process, theme development, and peer debriefing. Lastly, the co-authors involved in this study have diverse backgrounds from medicine, social science, public health and economics. This provided different perspectives to improve the understanding and interpretation of the data.

Confirmability answers the question: to what extent are our findings influenced by personal interests, motivation or biases? Confirmability can be assessed through the process of reflexivity. Since the researcher is seen as a tool in qualitative research, it is necessary to reflect on his or her own role in the study and how it may have shaped the knowledge produced. This process is often referred to as reflexivity.

I kept a field diary throughout all my visits to the field, but I was especially meticulous with recording my experiences, reflections and impressions during the in-depth interviews. I generally focused on the study participant, but it also included information on the family dynamic, interactions with other community members, the village characteristics among many other things. The diary was particularly helpful during the analysis phase when I was trying to interpret and contextualize the data.

I had been introduced to the Indian context while collecting data for my master's thesis in early 2010. However that data collection took place in the south of India where the context

and culture is quite different from the northern part where these studies took place. So while I had some previous exposure to Indian culture and values, I found this context new and unique to anything else I had previously experienced.

During the course of my research, I also became a mother for the first time. While I gave birth after the data collection, my pregnancy and childbirth certainly had an impact on my interpretation of the data. If I had been included in the study, I would have been categorized as an unintentional non-JSY beneficiary, meaning that I gave birth at home because my baby ‘came unexpectedly’ and ‘too fast’. When I reflect on my data collection, I realized initially that I felt a certain level of incredulity when the non-beneficiaries tried to explain why they had given birth at home and that it had not been an active choice but a chance of circumstances. From everything that I had read and understood through the experiences of others, the birth of a child was neither ‘fast’ nor ‘easy’. In fact, it was virtually impossible for it to sneak up on a woman. It was not until after my own experience of an exceptionally fast labor in Sweden, where I had no choice but to give birth at home because the ambulance did not arrive in time, that I finally understood what the women who had unintentional home deliveries were talking about.

6.3 IMPLICATIONS FOR THE JSY PROGRAM

It is obvious that high maternal mortality is complex and difficult to remedy. Selecting a policy strategy must be done with consideration of the capacity and quality of the existing health system, the context-specific drivers behind the choice of delivery location and the policy goal. Additionally no policy approach will work well in isolation; multiple synchronized levers need to be pulled in moderation on both the demand and supply side.

Programs like JSY are implemented, but governed by policies which are more overarching. The government of India was fueled by the policy to reduce maternal mortality. This policy is implemented as the JSY program. As I studied only the program, I will comment on implications for the program.

- Although program uptake was high in our studies, a significant proportion of poor and multiparous women continue to give birth at home. These women are the most vulnerable and at higher risk of maternal mortality that need to be targeted.
- Since the reasons for home deliveries vary, if the intention of the government is for *all* women to have a facility-based delivery, additional strategies aside from JSY and JEY will be needed. Since prior knowledge of the program was associated with higher program uptake, information, education and communication (IEC) strategies targeted at this sub-population implemented in the community could be used to reach them.
- Among other components, JSY most likely accelerated the normalization of facility-based deliveries versus delivering at home. Women expressed the importance of ‘safe’ deliveries in the health facility; however they deliver in public health facilities despite poor technical quality of care. Further, some women were deterred from delivering at a JSY public hospital because of the perception that the public health facilities did not have the capacity to manage complicated deliveries.

- Current literature suggests there is limited emergency obstetric care (EmOC) provision in the study districts, and this was substantiated by the low access of EmOC facilities. To ensure both positive short and long term outcomes (i.e. high proportion of institutional deliveries even if the cash incentive is discontinued and a reduction in MMR), it is critical the government continues to strengthen the provision of EmOC.
- Once there is improved provision of services, the government will need to leverage the community health workers to change the perception of the public sector not being able to manage complicated births. Just as the ASHA and JSY program helped create the new social norm to deliver in a health facility by influencing both individuals and also catalyzing change at the community level, the government can leverage something similar to help change the perception of poor quality (when it should be changed).
- The emergency transport service complemented JSY by reducing the physical access barrier, however many poor women still paid for their transport. In addition, many JEY users experienced a large delay in reaching the facility. There is an opportunity to improve both the coverage to reduce OOPE and the time it takes to reach the facility. (See section 7.1)
- Presently, OOPE payments in the public sector under the JSY program and hurdles to receive the cash incentive do not seem to outweigh the cash benefit of delivering under the program. However, if the women cease to see the advantage and stop coming to the facility for delivery or have to pay to participate (i.e. OOPE completely erodes the cash incentive), it could negatively influence policy goals of reducing MMR.

7 CONCLUSIONS

There was significant program uptake in our study area with a large majority of poor women participating in the program. Women who were uneducated, multiparous or lacked prior knowledge of the JSY program were more likely to give birth at home. These women reported difficulties accessing transportation. While in study I, women reported their main reason for participation was the cash incentive, study II found more nuances in the women's rationale for participation. The decision of most women to participate in the program reflected a change in social norms towards delivering in an institution along with individual perceptions of a safe and easy delivery and pressure from the ASHA. Many women reported their behavior was influenced by receiving the incentive, but just as many said it did not play a role in their decision to deliver in a facility. There were limits to the influence of the cash, and for many, behaviors may just as much be influenced by social norms and social pressures. Non-participation was often unintentional due to personal circumstances or driven by a perception of poor quality of care in public sector facilities. This was further supported by reasons for non-participation in study IV. Even though the uptake to the emergency transport service was low, the JEY complemented the JSY program by providing some of the most vulnerable women with transport to a health facility and decreasing the geographical barrier that many women reported in study I. Nevertheless, there are opportunities to expand the service to more women and improve the time it takes to reach the health facility. Finally, OOPE is still prevalent among women who deliver under the JSY program as well among those giving birth at home. However the cash incentive was large enough to cover the OOPE enabling the poorest women to have a net gain. The program seems to be effective in providing financial protection to the most vulnerable groups (i.e. women from poorer households and disadvantaged castes).

7.1 AREAS FOR FURTHER RESEARCH:

- High-powered incentives have the potential to influence a broad range of behaviors, which in turn may have both positive and negative implications for the welfare of the poor. Powell-Jackson has reported some unintended consequences of the JSY program, but this has not been fully studied.¹⁶⁶
- A lesson learnt from the JSY program is that maternal health programs should not only be designed to influence individual's behavior but also aim to catalyze change at the community level. It is crucial to understand what perpetuates such norms and how norms can be transformed by different kinds of interventions. While our research identified a shift, we do not know *how* it was formed. Further research is needed to understand how these norms were formed.
- There is a need to understand the ASHA's role fully in influencing JSY uptake. Does this happen through potential coercion?
- There is also a need for a cost-effectiveness study for the JEY service model.
- The reasons causing the extreme delays (≥ 2 hours) in reaching the health facility with the JEY transport are unexplored. Is it a matter of not having enough vehicles on the road, or are there other issues causing the delays?
- Women's perception regarding good-quality care in this context that would draw them into facilities is unknown. Further, how does this relate to good-quality technical and interpersonal care?

About the Researcher

I grew up in a small rural dairy farming town in upstate New York. As a child, I was naturally inquisitive and always wanted to know ‘*why*’...why did that happen? why did you do that? Both big and small whys...it didn’t really matter how trivial. I was a constant (loving) nuisance to my family, especially my brothers, always wanting to know what was going on, even to the point of being called ‘nosey’. However, coming from parents who both have had successful careers in business, I naturally followed in their footsteps and sought an education in business. I studied my junior year abroad and then met my future-to-be Swedish husband in my senior year. Coming from a small town, those two experiences sparked my passion for travel and learning about different cultures, no matter how subtly different they were to my own. I graduated from Clarkson University with a Bachelor of Science, with a major in business technology and a minor in finance. After I graduated, I spent the first part of my career in three fortune five hundred companies; General Electric, Starbucks and Microsoft as a business operations manager and project manager. I relocated with my husband to Sweden while working for Microsoft. It was during a conference in November 2008 on social media and the growing mobile phone technology where I first heard Hans Rosling speak. He ignited another passion I barely knew existed – global health – with his logical, data-driven, no-nonsense approach. I was hooked and immediately sought out possibilities to switch disciplines. My husband came across the Master’s in Global Health program at Karolinska Institutet and we both felt it was the right idea and time to apply. I began the program in September 2009 and serendipitously met an Indian PhD student who was working on a randomized control trial in India testing the effectiveness of mobile phone reminders and adherence to antiretroviral therapy. Since I had been working with mobile technologies, I was interested in using those potentially health-improving technologies as the subject of my master’s thesis. I also found throughout the course that epidemiology was the natural cure for my ever-present curiosity to know ‘*why*’. The PhD student then became my supervisor and we started working together. I went to Bangalore, a large city in the southern state of Karnataka, India for two months in the spring of 2010. I immediately fell in love with India. The more I learned about the culture, the people, the more I wanted to learn. I would later meet my current supervisor through work on my master’s thesis. I also met one of my co-supervisors through my master’s work, he was my thesis opponent. Once I finished my masters, I spent two months at the World Health Organization. It was there during an exhibit on reproductive health in low-income countries called “Women create life” that I felt my next passion start to emerge. Since I had already decided to continue my research in India, I spent every spare second that summer reading about maternal health, gender equality, female infanticide, and ‘the six million missing girls’. When I came back to Stockholm that fall, I met with my current supervisor to begin this incredible journey.

When so many pieces to an incredibly complicated puzzle fall into place, you do not question it. It was meant to be. But I will say that, to this day, I have not lost my childhood ‘nosiness’, actually if anything I have embraced it. I don’t think there could be a better quality for a researcher.

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Appendix 1: Topic guide for study II – JSY Beneficiaries

Birth Planning/Decision Making for Program Participation

You delivered in ____ (name place of delivery) Most women know roughly when they will deliver and decide before the baby comes where they would like to have the delivery or at whose hands will they like to deliver, what will they do when labor starts and so on.

Can you tell us about some of the things you thought about before your delivery?

Use the following prompts if necessary:

1. **When** did you make the decision to **deliver** your baby at _____?
 - a. Prompt: to understand if a decision was made before the labor began where she would deliver
2. **How** did you make that decision?
 - a. Prompt: Who was the **main** decision maker?
3. **Who** did you **discuss** this with in order to make the decision?
 - a. Prompt: Who it included: which family members (mother, mother-in-law, husband, ASHA)
4. What was the **most important factor** that led you to deliver _____?
5. Did you delivery **where** you wanted/planned to?
 - a. If **no**, Prompt to understand the barriers.

The ASHA's role in the decision on where to deliver:

You may be aware; the government has appointed a special woman in each village to help you get to the facility for your delivery.

1. Can you tell me about your **interaction** with the ASHA. What **role** did she play in your pregnancy?
2. **What** kind of things did you **talk** about when she visited?
 - a. Prompt: about the kind of help if any that she received from the ASHA

Transport to the Facility & the Delivery:

Now we would like to talk about the day the birth took place.

1. Can you describe the **main events that happened on the day of the delivery, before you got to the hospital?**
2. Can you describe **any problems** or complications, if any?
 - Prompt: When did the pains start?
3. **When was the decision made** to go to the facility?
 - Why then?
4. Can you tell me about your **journey to the facility** for your delivery?
 - a. (If any other vehicle than personally owned):
 - i. Prompt: **Who** arranged for the vehicle, when did it come?
 - ii. How **long** did it take before it arrived?
 - iii. **Who accompanied** you to the hospital?
 - iv. What was the **cost**?
6. How **long** did it take to get there?
7. (If they did not use Janani Express) What do you know of **free** transport by government for pregnant women?
 - a. Prompt: How did you get to know about it?
8. Since this service is **free**, why did you decide **NOT** to use it?

- b. *Prompt for barriers (they tried but it did not come, it took too long) to accessing the service*

Expenses and CCT experience:

1. What expenses did you incur around the time of your delivery?
*Prompt: Did you have to **buy** things from outside? (e.g. gloves, medicines etc)*
2. How did these expenditures **compare** with what you had planned for/anticipated?
3. How much did you spend?
4. **How** did you **pay** for the expenditures?
 - a. *Prompt: Loan, saved money, relatives, sell household items?*
5. Can you tell me about **any monies** you received to **help** with the delivery expenses?
 - a. *Prompt: Did you receive **any money** from the government?*
 - *If YES, how much, when, how/what mode?*
6. What kind of **difficulties** did you experience to obtain the money from the government?
7. How **should** the **money** from the government be spent?
8. How **did** you spend the money?
 - a. *Prompt: If it should cover the expenses they incurred*

Behavioral Intent:

JSY/Private Mother

1. In an ideal world, what is your **personal preference** regarding where a woman should give birth?
 - a. *Prompt: Why?*
2. What is the difference between a home and facility delivery?
3. Can you describe the **advantages of a hospital delivery**?
4. Can you describe the **disadvantages of a hospital delivery**?
5. Given what you say – overall, how has that experience of hospital delivery influenced where you feel a woman should give birth?
6. If the program went away, **how** would this **affect where** you deliver?

Appendix 2: Topic guide for study II – Home Deliveries

Birth Planning/Decision Making for Program Participation

Most women know roughly when they will deliver and decide before the baby comes where they would like to have the delivery or at whose hands will they like to deliver, what will they do when labor starts and so on.

Can you tell us about some of the things you thought about before your delivery?

Use the following prompts if necessary:

1. **When** did you make the decision to **deliver** your baby at **home**?
 - a. *Prompt:* to understand if a decision was made before the labor began where she would deliver
2. **How** did you make that decision?
 - a. *Prompt:* Who was the **main** decision maker?
3. **Who** did you **discuss** this with in order to make the decision?
 - a. *Prompt:* Who it included: which family members (mother, mother-in-law, husband, ASHA)
4. What was the **most important factor** that led you to deliver at **home**?
5. Did you delivery **where** you wanted/planned to?
 - a. If **no**, *Prompt* to understand the barriers.

The Delivery (for Home Deliveries):

1. As far as you can remember, can you tell us **what happened** on the day of the delivery?
 - a. *Prompt:* Who assisted?
 - b. When did they come?
 - c. What did they do?
2. Can you describe **any problems** or complications, if any?
 - a. *Prompt:* When did the pains start?
3. **How long** did the delivery take?
4. If you could go back in time, **what would you change** about how the delivery went (if anything)?

The ASHA's role in the decision on where to deliver:

You may be aware; the government has appointed a special woman in each village to help you get to the facility for your delivery.

1. Can you tell me about your **interaction** with the ASHA. What **role** did she play in your pregnancy?
2. **What** kind of things did you **talk** about when she visited?
 - a. *Prompt:* about the kind of help if any that she received from the ASHA

Delivery Expenses & JSY Knowledge:

1. What expenses did you incur around the time of your delivery?

Prompt: What did you to **buy**? (e.g. gloves, medicines etc)
2. How much did you spend?
3. **How** did you **pay** for the expenditures?
 - a. *Prompt:* Loan, saved money, relatives, sell household items?
4. Can you tell me about **any monies** you received to **help** with the delivery expenses?
 - a. *Prompt:* Did you receive **any money** from the government?
 - If **YES**, how much, when, how/what mode?

- *If check was given: has the check been cashed?*
- 5. What kind of **difficulties** did you experience to obtain the money from the government?
- 6. Can you tell us about **any government schemes** designed to help women give birth in a hospital?
 - *Prompt: ASHA, Janani Express, 1400rs*
 - What do you know about the scheme/s and **how it works?**
 - How did you **hear about it**/them?
 - Why did you decide **NOT** to use it?

Barriers to Institutional Delivery:

1. *You decided to deliver your baby at home.* Can you tell us a little bit about why you **decided** to deliver at home instead of a facility?

Prompt Around the main barriers;

- **Availability of the** facility and their services – existing facility with services in place to handle deliveries
- **Accessibility** to a health facility – transportation to the facility
- **Ability to pay** for services – financial means to pay for the costs incurred due to the delivery

Future Birth Activities:

1. In an ideal world, what is your **personal preference** regarding where a woman should give birth?
 - a. *Prompt: Why?*
2. Can you describe the **advantages of a hospital delivery?**
 - a. Advantages of a **home** delivery?
3. Can you describe the **disadvantages of a hospital delivery?**
 - a. Disadvantages of a **home** delivery?

Appendix 3: Detailed information on the selection of health facilities (Study III)

